SEPTEMBER 1953

FOUNDRY

...WHEREVER METALS ARE CAST

A Special Report On European Foundry Progress

—p. 102

5900 FOUNDRIES IN U.S. AND CANADA

—p. 134

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Sept.-Dec. 1953

produce cleaner, sounder iron castings with Purite

HIGHER PERCENTAGES of finished castings per ton of metal poured.

100% FLUXING ACTION in the cupola . . . 100% desulphurizing action in the ladle.

FAST-ACTING Purite gets to all the iron quicker.

TIME-TESTED and proved for unsurpassed desulphurizing uniformity.

UNIFORM 2-lb. pigs and 2-oz. tablets eliminate weighing or measuring.

PURE FUSED SODA ASH —you do not pay for inert materials.

EASY TO HANDLE—Purite does not crumble—no waste, no dust.

SAVE ON BULK carload shipments—Purite is easily stored without deterioration.

MATHIESON

MATHIESON CHEMICAL CORPORATIO
Mathieson Industrial Chemicals Division
Baltimore 3, Maryland

Purite, the scientific flux for better melting and cleaner iron, is sold by leading foundry supply houses in the United States and Canada.

TECHNOLOGY DEPT.

Foundromatic Dryer Dries Core in 3 Minutes...

Takes 70 Minutes in Conventional Oven

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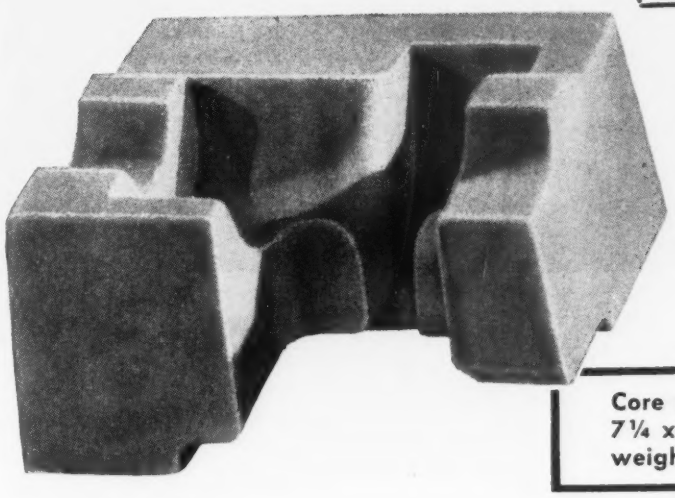
DETROIT



Core measures: 7¼ x 6¾ x 4, weighs 7 pounds.

WITH THE *Foundromatic* dryer you not only slash core *baking* time, but you reduce core *handling* time by eliminating:

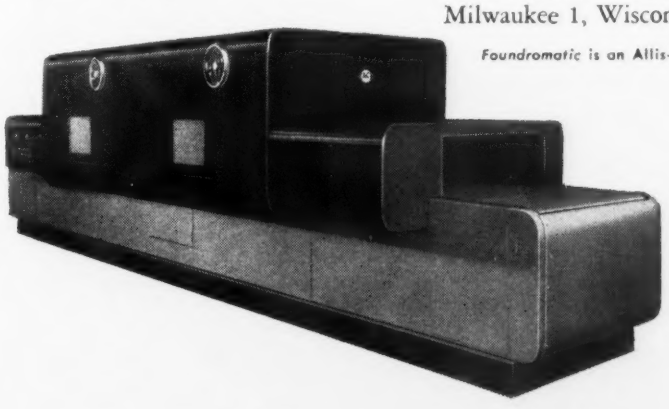
1. **Collecting Rack**
2. **Cooling Rack**
3. **Storage Rack**

Cores can go directly from the *Foundromatic* dryer to the molder. They are cool, dry, ready-to-use the moment they come out of the dryer.

In addition, these cores have excellent shakeout characteristics and a smooth finish that means better castings. Fuel costs are lower, too, because no energy passes between the electrodes when there are no cores in the oven. No overbaking either! A core left in the oven all day will not burn.

Find out more about the time- and money-saving *Foundromatic* Core Dryer by calling your nearby Allis-Chalmers district office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3891

Foundromatic is an Allis-Chalmers trademark.



ALLIS-CHALMERS

FOUNDROMATIC
Dielectric
SAND CORE DRYER

QUESTIONS and ANSWERS
About Dielectric Sand Core Drying

1. *How much savings can I expect with the* Foundromatic *core dryer?*

   Estimated savings of 55% to 70% have been reported.

2. *Do I need an electronic engineer to help me?*

   No. Once equipment is installed and operating, any personnel can be quickly trained to follow operating instructions.

3. *How much maintenance is there?*

   Very little. Periodic oiling of conveyor and blower motors and rollers; and replacement of tubes.

4. *How long must we wait after cores pass through dryer before they can be used?*

   Cores can be used immediately.

5. *Does the* Foundromatic *core dryer use power when empty?*

   No. Dielectric heaters inherently deliver no power unless the material is between the electrodes.

6. *Will light sections burn if dried with heavy sections?*

   No. Cores will not burn in the *Foundromatic* core dryer.

7. *What about collapsibility?*

   Resin bonded cores have very good collapsibility, contributing to a faster, cleaner shakeout.

SEND

Allis-Chalmers A-3891
Milwaukee 1, Wisconsin

Please send me new 8-page booklet 15B7306B containing complete information on the *Foundromatic* sand core dryer.

Name .....
Title .....
Company .....
Street .....
City State

EASY SAND CONTROL

We don't say it's as easy as A-B-C, but we do insist the seacoal-bentonite-stabilizer method will *simplify* sand control for you. And give you uniform, thoroughly satisfactory results!

By adding the above-mentioned materials to your sand in varying amounts, sand characteristics can be closely controlled and changed at will—to satisfy specific requirements. Carbon content is controlled by adding CROWN HILL SEACOAL. Green and dry strengths are varied by the addition of FEDERAL GREEN BOND BENTONITE. Greater flowability and better shakeout are obtained by adding FEDERAL SAND STABILIZER.

Common lake, river or beach sand can be used for replacement, without danger of grain size going out of balance—as will happen when offals of cores, made of coarse sand, mix with fines which must be used with emulsified asphalt or resin additives. And, (you'll like this!) *the cost of these three additives will not exceed $1.00 per ton of castings produced!*

So, for easy, efficient, economical sand control—change to the method of sand preparation already preferred by an overwhelming majority of iron foundries. We have a new bulletin with full details —write for your copy—TODAY!

CROWN HILL SEACOAL

Produced by *Federal* at Crown Hill, West Virginia. *High* in volatile combustible material, low in sulphur and ash content—basic requirements for a top quality seacoal. Ground or granulated to properly match the sand used.

FEDERAL GREEN BOND

Mined, processed and guaranteed by *Federal*. Unexcelled in uniformity and ability to develop green and dry strength. Possesses many times the natural bonding power of any other sand bond. Truly the best of the bentonites!

FEDERAL SAND STABILIZER

A processed cellulose sand additive whose high combustibility allows sand to expand evenly to eliminate casting defects. It increases sand flowability to provide better ramming conditions and attracts moisture to broaden the safe moisture range.
IMPORTANT . . . Federal Sand Stabilizer also holds lumpy shakeout to an absolute minimum!

FEDERAL

The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL, W. VA. • CHICAGO • DETROIT • MILWAUKEE • RICHMOND, VA. • ST. LOUIS • CHATTANOOGA • NEW YORK • UPTON, WYO.

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FOUNDRY

Volume 81—Number 9

SEPTEMBER 1953

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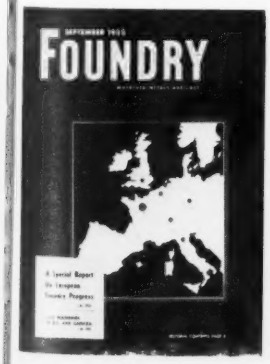

THE COVER: Foundry experts from the pinpointed European countries describe progress in foreign foundries. Series of reports starts p. 102

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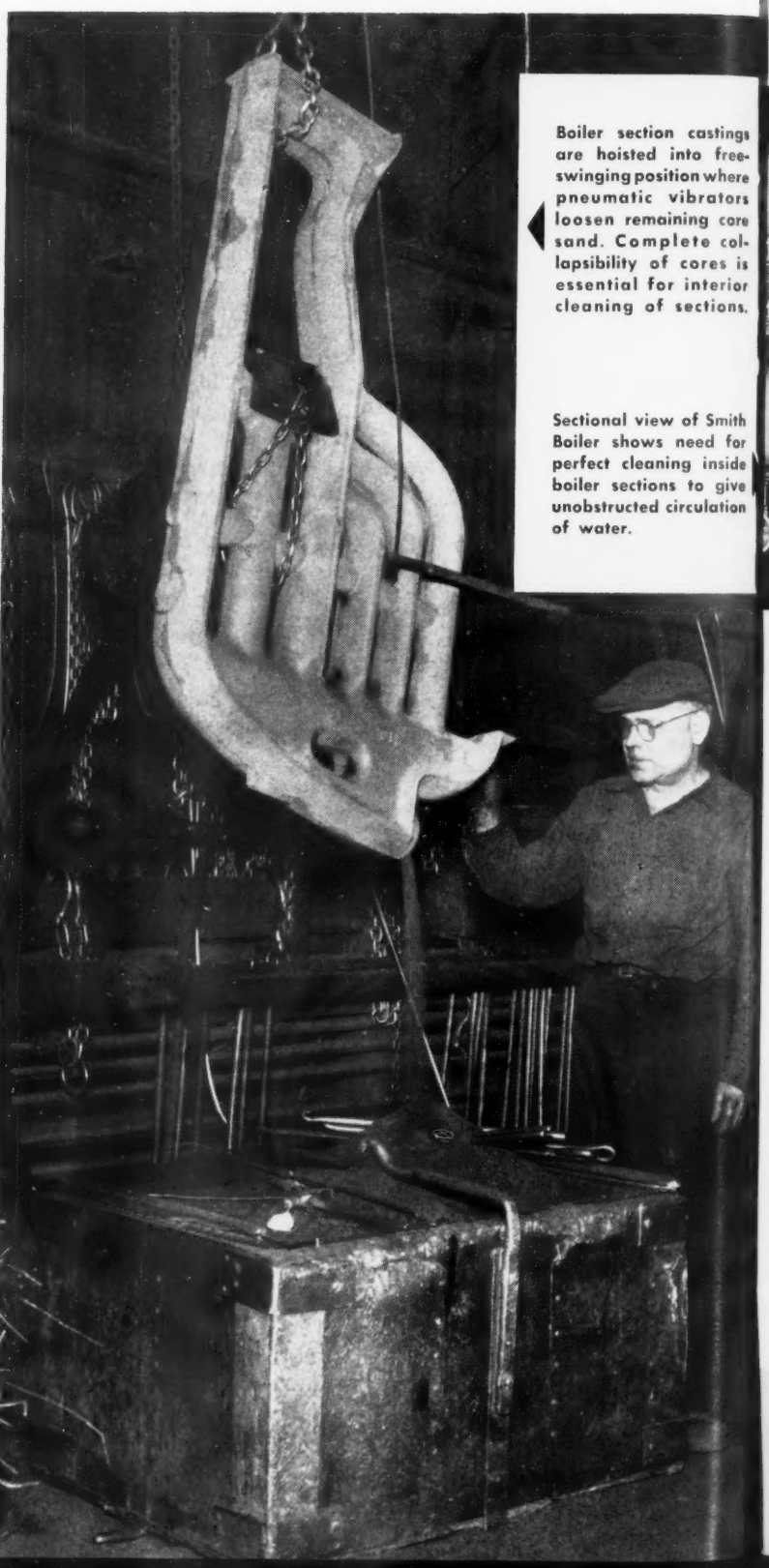
boiler cores shake out like sugar...

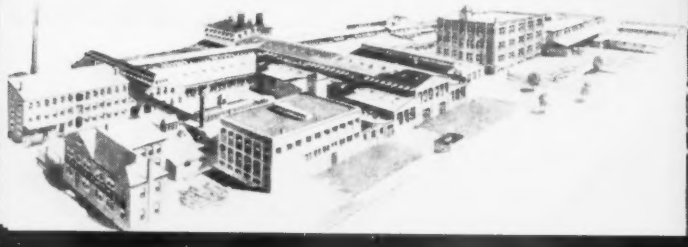
with



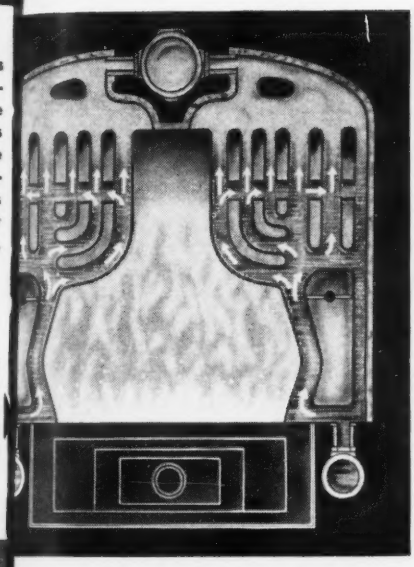
Boiler section castings are hoisted into free-swinging position where pneumatic vibrators loosen remaining core sand. Complete collapsibility of cores is essential for interior cleaning of sections.

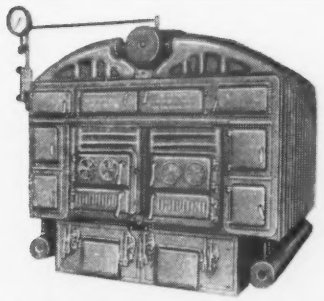
Sectional view of Smith Boiler shows need for perfect cleaning inside boiler sections to give unobstructed circulation of water.

THE H. B. SMITH CO., INC., Westfield, Mass., a century old this year, has used **LINOIL** exclusively since 1929.

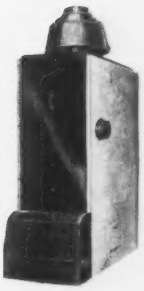


LINOIL





Heavy-duty twin sectional cast-iron header type boiler for industrial, commercial, and institutional applications.



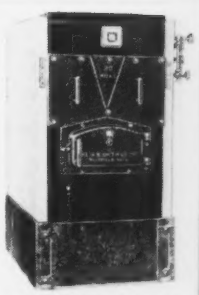
Smith "Century" Special Gas Boiler for homes and small buildings.

H. B. SMITH, one of New England's pioneer foundries, mass produce quality boilers for homes, factories and public buildings.

Bottlenecks are eliminated in the cleaning department because cores made with LINOIL are completely collapsible —they shake out like sugar. No sand is left inside to cause obstructions.

If you are having "internal trouble" (that is, in cleaning out casting cavities) call in your ADM representative to demonstrate the collapsibility of LINOIL-mixed cores.

Smith-Mills Oil Burning Boiler for homes.



Smith-Mills boiler for smaller commercial buildings.

write for information on the ADM line of foundry products:

LINOIL	INDUCTOL	FRE-FLO	LIN-O-CEL
CORE OIL	FAST-BAKING CORE OIL	PARTING COMPOUND	SAND STABILIZER

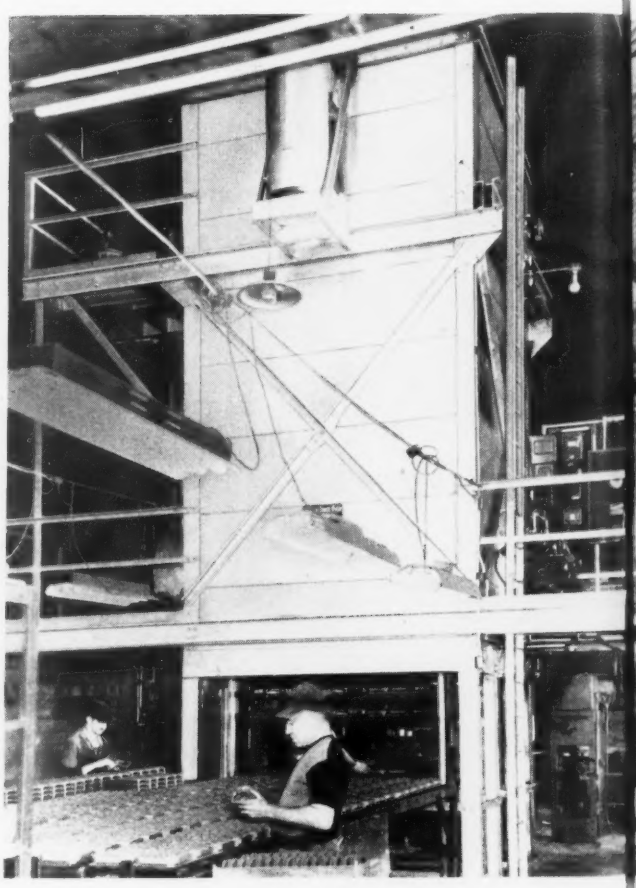
ARCHER • DANIELS • MIDLAND COMPANY

FOUNDRY PRODUCTS DIVISION • 2191 WEST 110TH STREET • CLEVELAND 2, OHIO

lowest cost cor

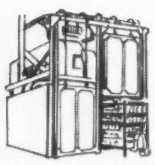
COLEMAN Tower

Coleman Tower Oven at Monroe Steel Castings Company

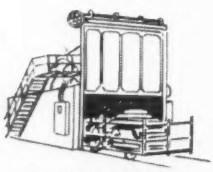


Coleman Tower Oven at Barnes Manufacturing Company

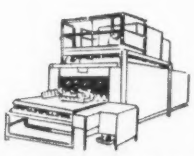
A COMPLETE RANGE OF TYPES: COLEMAN OVENS are built in a complete range of sizes and capacities for every core-baking and mold drying requirement.



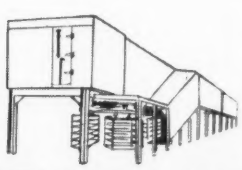
TRANSRACK OVENS



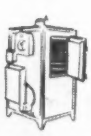
CAR-TYPE OVENS



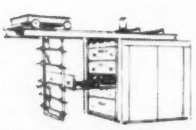
CONTINUOUS REDRY OVENS



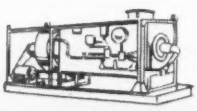
HORIZONTAL CONVEYOR OVENS



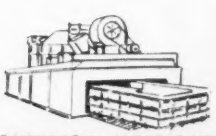
PORTABLE OVENS



ROLLING DRAWER OVENS

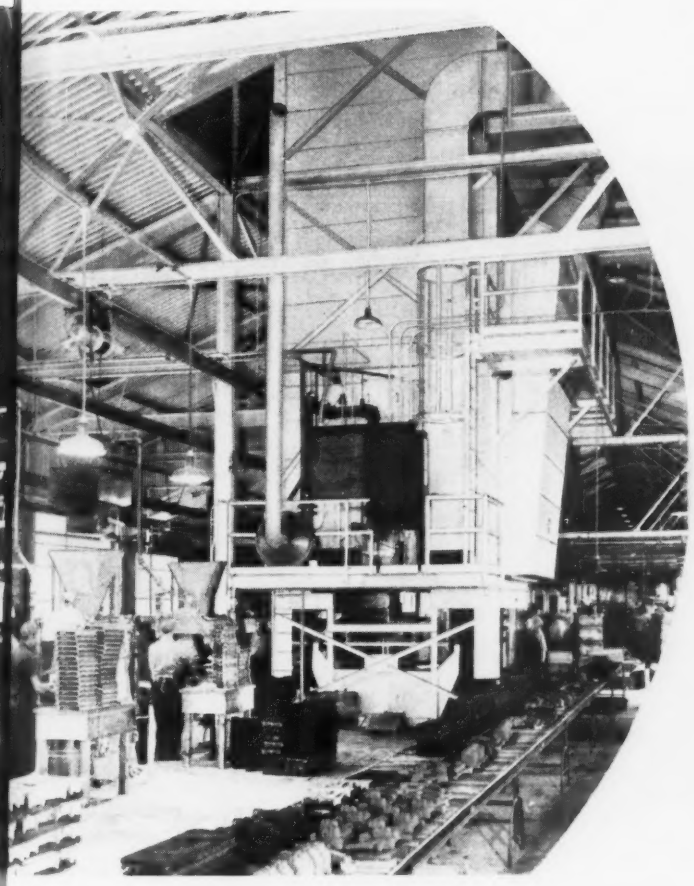


PORTABLE MOLD DRYERS



CONTINUOUS MOLD OVENS

oraking method...
rOVENS



...an Tower Oven at National Sewing Machine Company

No other method compares with Coleman Tower Ovens for core-baking efficiency. Only Coleman Tower Ovens have the exclusive features which enable cores of widely different sizes and shapes to be handled at the same time, all baked with consistent uniformity!

Coleman Tower Ovens have the patented open center which increases oven loading accessibility and improves productivity of coremakers. By eliminating trucks, racks and multiple handling operations, Coleman Tower Ovens provide savings up to 75%.

Hundreds of foundries from coast-to-coast have proved that Coleman Tower Ovens have regularly outperformed any other method of high quality core baking. Our engineers are available without obligation to show you how you can obtain greater core output from less space at remarkable savings...call or write.

***Only* COLEMAN TOWER OVENS**
offer all these advantages:

EFFICIENT HANDLING METHODS eliminate delays and losses.

PERFECT CORE BAKING ends manpower and casting losses due to make-overs and rejects.

INCREASED PRODUCTION by making the most efficient use of skilled and unskilled labor.

SUPERIOR WORKING CONDITIONS...cores are cooled and smoked-off before leaving oven.

HEAVY DUTY CONSTRUCTION for continuous dependable performance and economical operation.

GREATEST SAVINGS IN FUEL by using the most economical fuel available.

SAVE BINDER. Proper core baking atmosphere and uniform temperature permit important savings in conventional binders.

USE HIGH SPEED CORE BINDERS. Coleman Ovens have uniform temperature and accurate control to handle temperature-sensitive resins and pre-baked oils.

Write for Bulletin C

THE FOUNDRY EQUIPMENT COMPANY

1831 COLUMBUS ROAD

CLEVELAND 13, OHIO

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

If you are interested in more of the story on these old furnaces, it will be a pleasure to mail you a folder. It tells how we made iron the hard way before the modern blast furnace came along.

VICTORY FURNACE

Years have passed since the old Victory furnace was in blast, but it still stands as a monument to the early days of iron. It was built in 1843 when iron masters were crossing the mountains to carve out new frontiers in Western Pennsylvania. It stands 60 miles south from Erie, as the crow flies, and is the best preserved of 20 or more furnaces in the same area. Ore was where you found it, and that is where the furnaces were built. With limestone close at hand, and the makings for charcoal in plentiful supply, it only required the know-how to run these plants at their normal capacity of three tons per day. Black spots on the ground indicate where the charcoal ovens stood, and pieces of slag are still scattered thickly across plowed fields.

Pioneering is the order of the day with United, too, and our search for new and better methods in bonding cores has brought us three bulls' eyes.

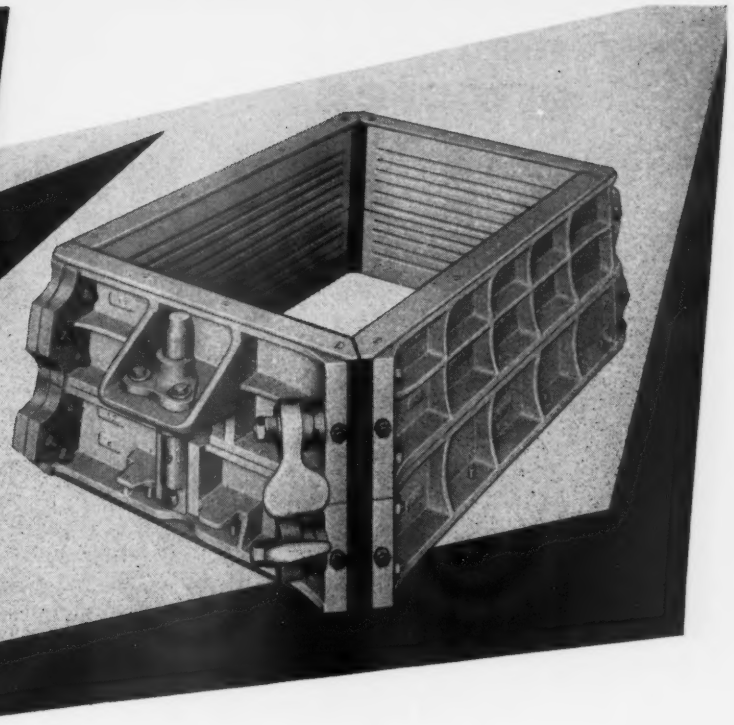
1. Fast baking oils in the high strength class.
2. Resin type binders with new speed for baking.
3. An air drying wash for molds and cores.

This work which we did, can be of real service to you. Bulletins are available on (a) a group of fine strong core oils, (b) resin binders which can be used in conventional ovens or for dielectric baking, and (c) our air drying washes for molds and cores. We will gladly mail any of these bulletins on your request.

UNITED OIL MFG. COMPANY

1429 WALNUT ST. • ERIE, PA.

TWICE AS STRONG
A Third Lighter



—that's why magnesium is so popular for flask construction...

Magnesium has twice the tensile strength of aluminum, thus assuring longer service, and magnesium weighs 1/3 less than aluminum, making for easier handling.

FREMONT MAGNESIUM FLASKS

with their accurately machined inside surfaces and flanges and steel-faced top and bottom flanges, assure more exacting work.

THE NEW FREMONT SPREADLOCK FLASKS

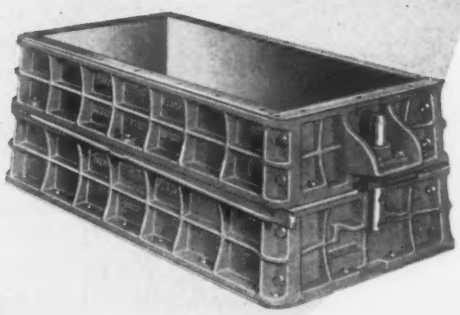
have long-life, easily replaceable, live-rubber corner inserts which completely close the corner gaps so that no sand can lodge in the open corners.

PERFECT ALIGNMENT INDEFINITELY!

is guaranteed by the one-inch GROOVLOCK FOOLPROOF PIN on

FREMONT STANDARD SLIP FLASKS

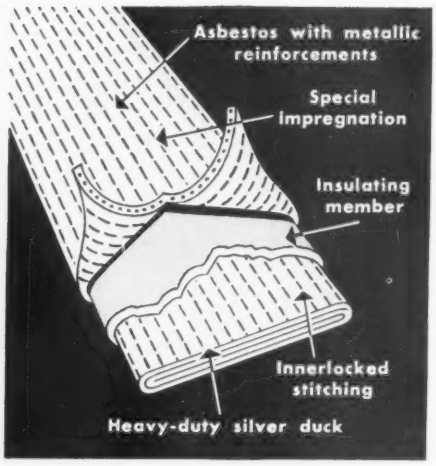
Particularly adapted to cope or drag pattern jobs. Solid, bolted and welded corner construction. Other types of standard pin fittings also available.



THE FREMONT FLASK COMPANY
FREMONT, OHIO

Write today for free literature and prices. All orders given prompt attention.

NEW armored belting resists abrasion and impact



WITHSTANDS HEAT, TOO!

Insulated SAHARA Belts have long been famous for maximum heat resistance and long wear. Almost every plant that has tested these belts now uses them exclusively for handling hot materials.

Now Imperial is manufacturing Sahara Insulated *Armored* Belting with wire reinforcements that gives extra value at no extra cost. The reinforcing wire is spun together with the asbestos fibers. Result: maximum resistance to abrasion and impact, as well as heat.

Tell us your belting problem and we'll recommend the belt that will cost you less in the long run. In addition to heat-resistant belts, Imperial also makes job-designed belts for handling boxes, crates, grains and other bulk materials.

Write for Data Sheet 48-4A.

Sahara Insulated Armored Belting

(Also Super Insulated)

Imperial
BELTING CO.
1755 S. Kilbourn Ave.
Chicago 23, Illinois

Engineered belting
. . . the right belt for each job

With the Editors

A SPECIAL REPORT: As far back as Atlantic City in 1952, foundrymen were talking about a trip to Europe for the International Foundry Congress to be held in Paris in September, 1953. Plans were made, tours both before and after the congress were prepared, and the possibility of visiting Europe this year was considered by many.

While the total is not as great as first anticipated, it seems certain that approximately 125 Americans will be on hand for the opening of the congress in Paris this month. Headed by L. N. Shannon, president of the International Committee of Foundry Technical Associations and past president of AFS, the party will include AFS President Collins L. Carter, past presidents Ralph J. Teetor and I. Richards Wagner, AFS Secretary William W. Maloney and numerous present and past AFS directors.

In order that readers of FOUNDRY may have some idea of the developments the American party will find in a number of European countries, the editors have asked leading foundrymen in Great Britain, France, Belgium, Netherlands, Switzerland, Italy and Germany to report briefly on foundry progress. These special reports are presented in a 16-page section of this issue, starting on page 102. The program and other features of the congress appear on pages 118 and 119.

—o—

Report of the Congress: Vincent Delport, since 1924 the European manager of FOUNDRY with headquarters in London, will be in Paris for the congress. His report of the highlights and important technical developments of the meeting will be presented in detail in the November issue.

—o—

A New Gadget: For a number of years I have been assigned the duties of chef at our frequent picnics in the yard. Although I have attempted numerous menus, the specialties most enjoyed are pancakes and maple syrup for those Sunday or holiday breakfasts, and hamburgers for later in the day. The job of making hamburger patties for a large crowd usually is a bother, since it is difficult to get them the same size and thickness. Now the problem has been solved, for I have a new hamburger patty maker that turns out uniform patties in quick time. The device, built of three aluminum castings, was made and presented to me by George J. Cadey, Cadey Aluminum Foundry Co., Grand Rapids, Mich. Hamburger is rolled into balls of proper size, the ball is placed on the tray of the machine, a handle is pressed, and the patty is complete. It's about time someone devoted a bit of attention to easing the drudgery of us back-yard chefs.

—o—

Dr. Hugo Dies: After the "Special Report on European Foundry Progress" had gone to press, a cablegram was received from Vincent Delport announcing with regret the death of Dr. Ing. E. Hugo, secretary, Verein Deutscher Giessereifachleute and editor, *Giesserei*. Dr. Hugo is the author of the report on German foundry practice in this issue.

—o—

Friendliness: Remarks by Charles A. Gutenkunst Jr., president, Milwaukee Malleable & Grey Iron Works, Milwaukee, in accepting the Charles H. McCrea award at the recent annual meeting of the Malleable Founders' Society were impressive. Mr. Gutenkunst said, "During the past 20 years a change has taken place which I believe is important, namely the gradual increase in friendliness of the members toward one another. Research, cost accounting procedures, exchange of shop practice information, and market development are all necessary, but these activities can be much more effective in a friendly atmosphere.

"It seems to me that this industry has learned how to work together for the worthwhile things. But we have just scratched the surface. If we will continue to pool our thinking and our talents, we can go much farther and make the malleable industry not only increasingly worthwhile in the economy of our country, both in war and in peace, but an industry which will be a happy

(*Concluded on page* 12)

Safeguard

THAT MOLTEN METAL FROM FURNACE TO FLASKS!

Use Crucibles or preformed ladle liners for carrying. When melting in stationary furnaces, the problem is simple: Just lift out the Crucible and carry it to the molds.

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Protect the molten metal from contamination or undue chilling all the way.

Scene in bronze valve foundry of the Belknap Manufacturing Company, Bridgeport, Conn. Illustrates the use of preformed ladle liner, in this case, made with skimmer and bottom pour tube. Pure metal is assured by automatic separation from slag and dross. Capacity of liner, 250 lbs. brass.

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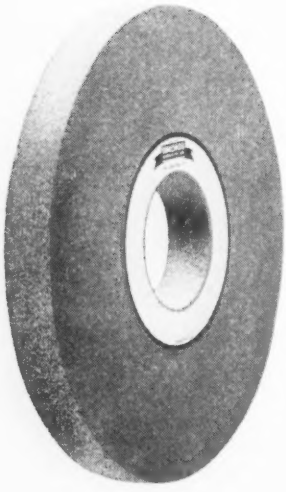
Grinding Wheels



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(*Concluded from page* 10)

place in which to work."

Charlie, this goes for the entire foundry industry.

—o—

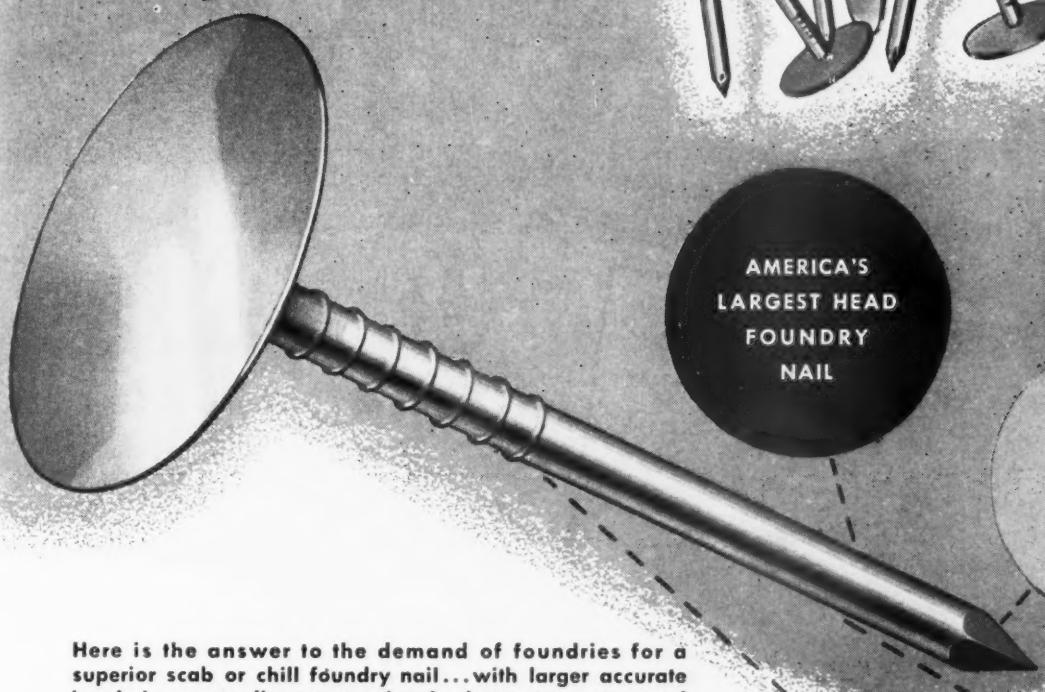
First Subscription: Sixty-one years ago this month, John A. Penton published the first issue of FOUNDRY. It was a small magazine of 36 pages and carried an annual subscription price of $1. FOUNDRY first appeared in the era when merchants and industrialists took great pride in having the first dollar they took in properly labeled, framed and displayed on the wall of their offices or establishments. But the founder of this servant of the great foundry industry was much more of a showman than the ordinary run of entrepreneurs of that day. He changed the dollar received for the first subscription into a gold dollar and then had that beautiful gold piece made into a stickpin, another fashion which has faded in recent years.

This pin came to light recently when an old safe in the Penton auditing department was being cleaned out preparatory to rearrangement of facilities of the department. It is quite interesting that the gold dollar used was minted in 1853, just 100 years ago. The dollar is even smaller than the 1953 dime, being about $\frac{3}{32}$-in. diam.

To one who has carried the editorial responsibility of FOUNDRY longer than any other person, including its founder, this pin has great sentimental value. It is a symbol of the humble beginnings of this magazine, but it is also evidence of the showmanship and enterprise of its founder.

A Bigger Bargain: Yes, during that first year, the subscription price for FOUNDRY was $1, and the 12 issues contained a combined total of 724 advertising and editorial pages. In 1952, the subscription price was $5, and a total of 3812 pages of advertising and editorial material was distributed to readers. So, in spite of wars, inflation, and disappearance of the "good old days," a subscriber now gets more for each dollar than he did back in 1892-93. At the same time, both editor and advertiser like to think that the quality and diversity of material published in each issue greatly enhances the importance of FOUNDRY to foundrymen. —F.G.S.

NOW! fine FANNER bullhead FOUNDRY NAILS



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BURRLESS DIAMOND POINT for easy, fast handling

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SAVES TIME AND EQUIPMENT
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One FANNER nail equals two ordinary nails

Here is the answer to the demand of foundries for a superior scab or chill foundry nail... with larger accurate head size... sturdier construction for better support... and burrless diamond point that saves handling time.

Foundrymen everywhere for years have asked that FANNER produce a better foundry nail—and the new FANNER "Bullhead" nail is the result of specialized experience, new and exclusive machinery, and months of testing. One FANNER "Bullhead" Nail will do the work of two or three ordinary types. They are clean... smooth... strong, easy to pick up and use. Only FANNER could produce a nail that is so exactly suited for many foundry applications. Get FANNER "Bullhead" Nails... compare the difference in quality... and they cost less than similar types.

Available in two types—order them through your foundry supply jobber or write direct.

BULLHEAD FOUNDRY NAILS

SIZES	10 gauge—⅝" HEAD			11 gauge—9/16" HEAD			12 gauge—7/16" HEAD		
LENGTH	¾"	⅞"	1"	1¼"	1½"	1¾"	2"	2½"	3"

LARGE HEAD NAILS

SIZES	9 gauge—½" HEAD				10 gauge—½" HEAD				11 gauge—7/16" HEAD			
LENGTH	⅞"	1"	1¼"	1½"	1¾"	2"	2¼"	2½"	2¾"	3"	4"	5"	6"

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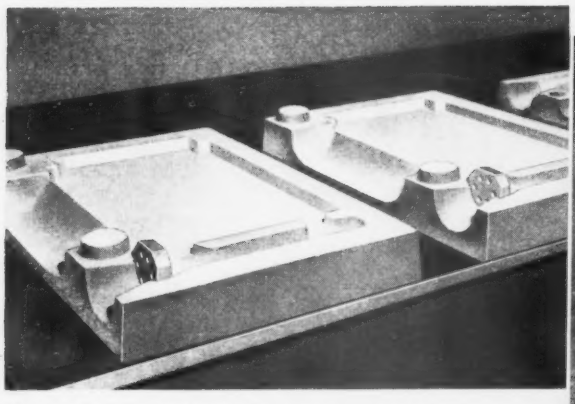
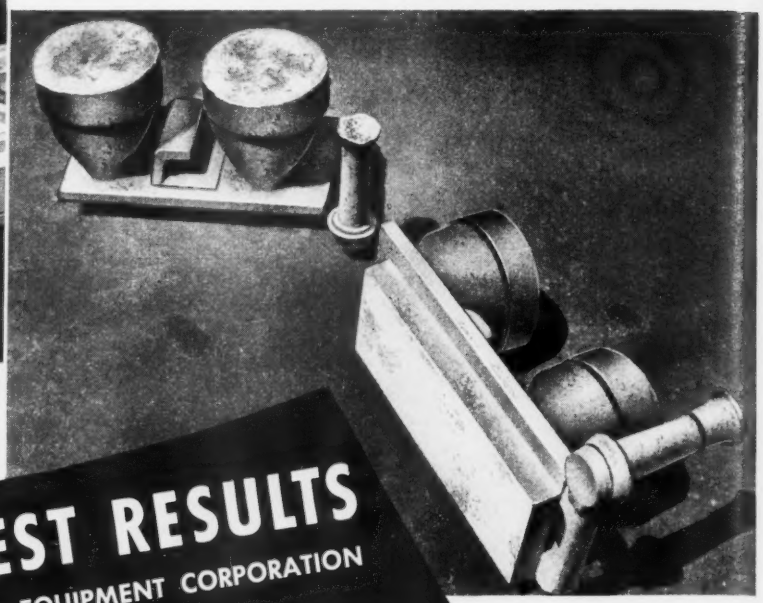


Above: AlSiMag Strainer Cores in gate of mold.
Right: Cores in gates after shakeout. AlSiMag Strainer Cores do not contaminate the scrap but float off in the melt.



COMPARATIVE TEST RESULTS

FROM AMERICAN WHEELABRATOR AND EQUIPMENT CORPORATION MISHAWAKA, INDIANA

AMERICAN WHEELABRATOR & EQUIPMENT CORPORATION

MISHAWAKA, INDIANA U.S.A.

THE AMERICAN MOLDER

June 15, 1953
[illegible] 16th Year

Indiana Products Company
Kokomo, Indiana

Attention: Mr. H. J. Druecker

Gentlemen:

We are pleased to report the results of our tests with the AlSiMag Strainer Cores which you recommended for our application some time ago.

After making these tests, we found that AlSiMag Cores are more economical than the sand cores which we previously used and which we made ourselves.

We have been using your cores in pouring temperatures from 2600 to 2850° F., and since their adoption, we have had no difficulties with inclusions in our castings. We have found AlSiMag Cores highly satisfactory for every use we have put them to in our plant.

Very truly yours,

[illegible]

AlSiMag®

STRAINER CORES

are

- "More economical than sand cores"
- "Free from difficulties with inclusions"
- "Used in pouring temperatures from 2600° to 2850° F."
- "Highly satisfactory for every use"

MAKE YOUR OWN COMPARATIVE TESTS

Samples of standard sizes sent free on request. Special test samples to your specifications made at low cost. Compare them with any refractory or sand core for cost and performance. Let your own tests prove that AlSiMag strainer cores do a better job.
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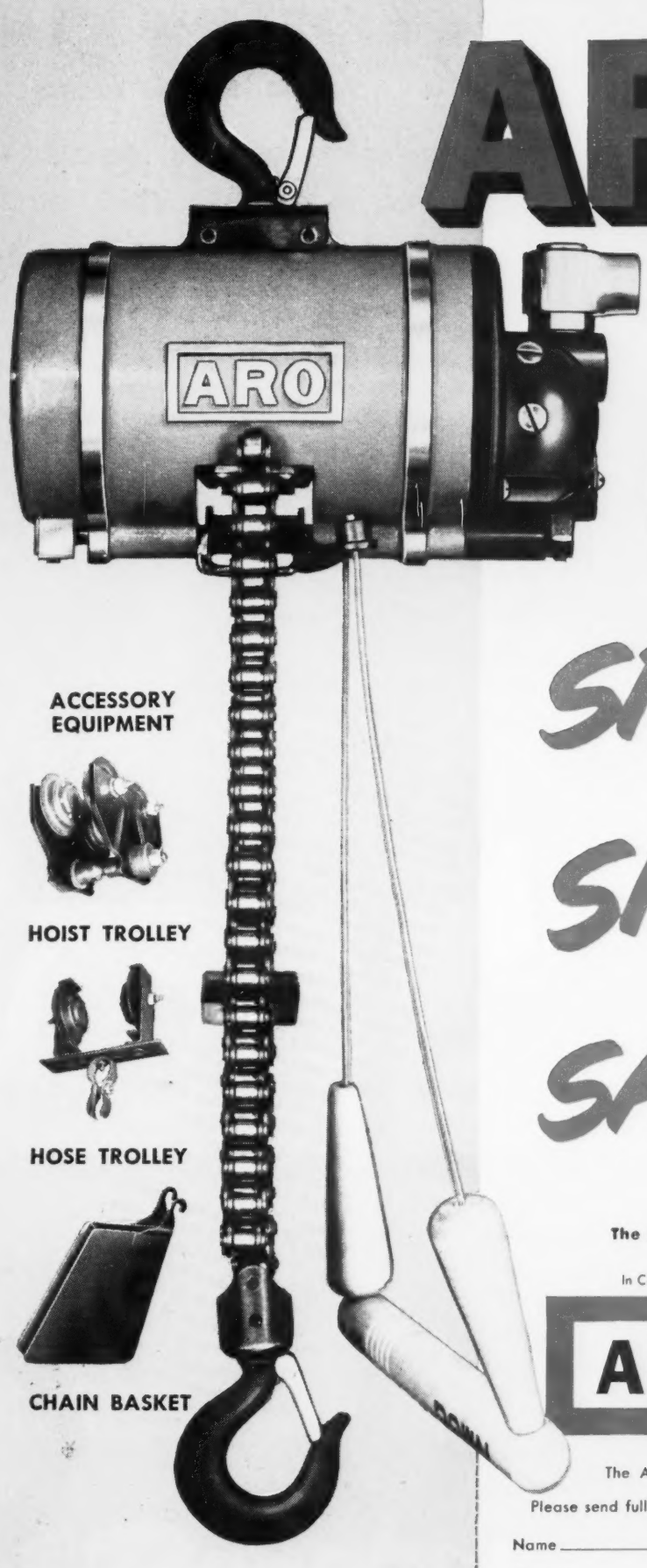

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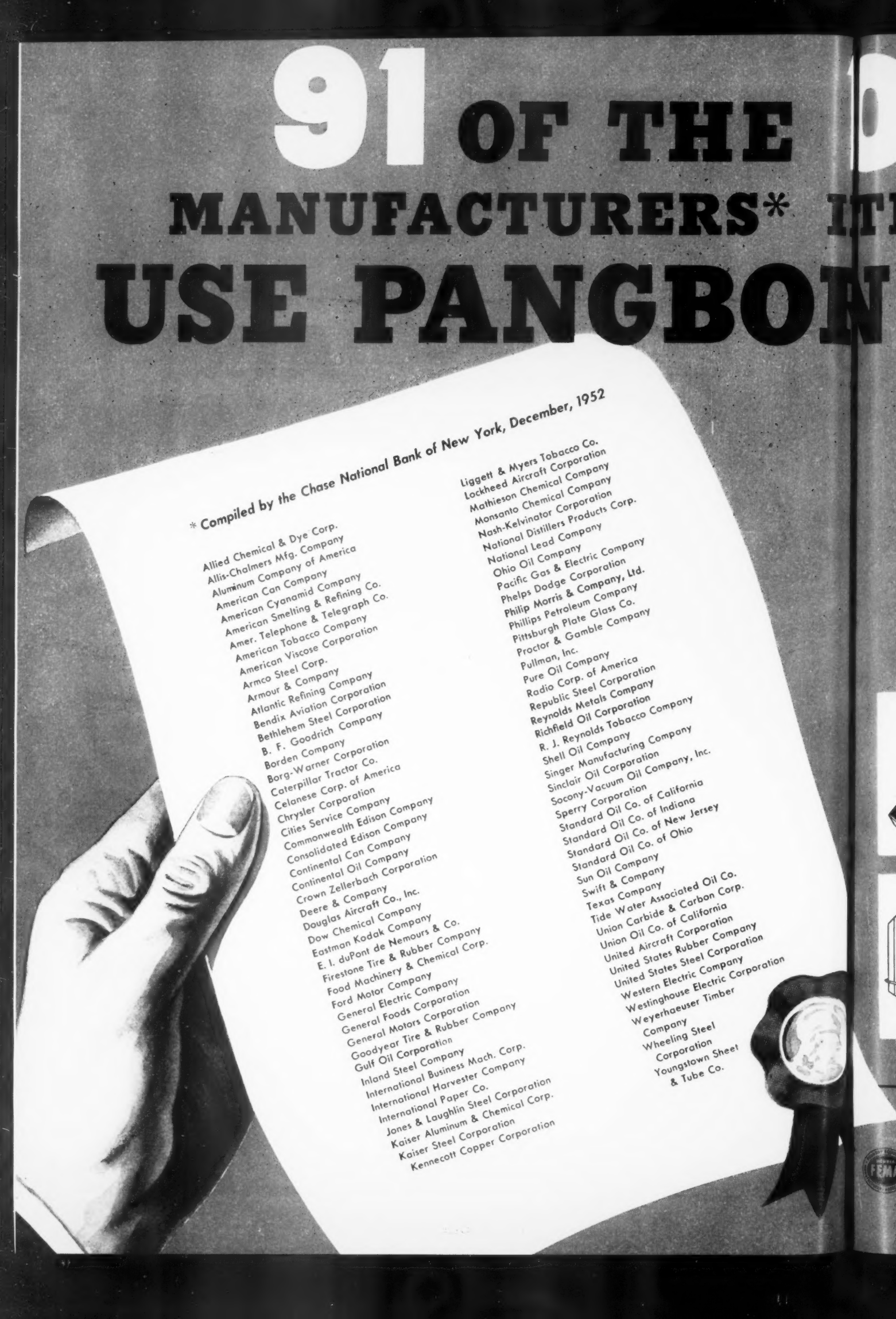

* Compiled by the Chase National Bank of New York, December, 1952

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Allis-Chalmers Mfg. Company
Aluminum Company of America
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American Cyanamid Company
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Lockheed Aircraft Corporation
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Ohio Oil Company
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Singer Manufacturing Company
Sinclair Oil Corporation
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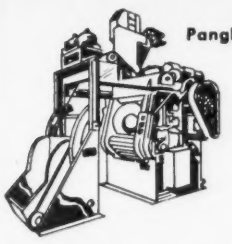
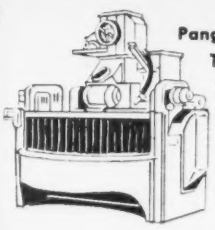
The 91 companies shown at left represent a total of $77,068,000,000 in assets! Yet these industrial giants, among the top hundred manufacturers in the country, represent a small percentage of Pangborn users among America's manufacturing concerns. Today more than 28,000 Pangborn Blast Cleaning Machines and Dust Collectors are cutting costs and improving working conditions in plants, large and small, throughout the country.

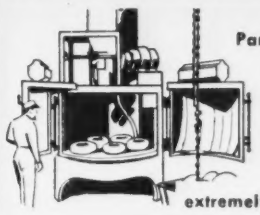
The reason for this record is easy to understand. For 49 years, experienced Pangborn engineers backed by Pangborn facilities have been designing and producing equipment to help solve industry's blast cleaning and dust problems. They have speeded up blast cleaning. They have modernized dust control. They can do the same for you. Find out how Pangborn can help you—write for Bulletin 214 (Blast Cleaning) or Bulletin 909A (Dust Control) or both. Address: PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md.



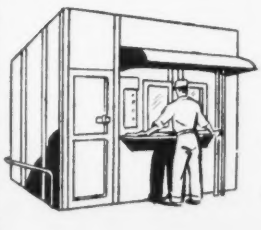
Pangborn Blastmaster Barrels for top efficiency in batch cleaning method. Latest addition to the Pangborn line.



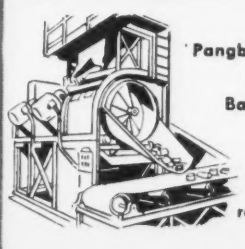
Pangborn ROTOBLAST® Tables for semi-continuous blast cleaning. Types and sizes for all sizes and shapes of work.



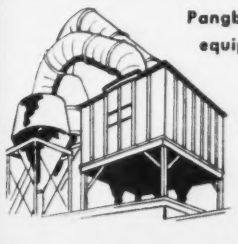
Pangborn ROTOBLAST Table-Rooms for general-purpose blast cleaning. An extremely efficient machine for jobbing foundries.



Pangborn Hydro-Sand Blast Rooms for simultaneous blast cleaning and core-removal.



Pangborn "Continuous-Flo" ROTOBLAST Barrels for cleaning a steady flow of miscellaneous work at a high rate of production.



Pangborn Dust Control equipment traps dust at the source. Permits reclamation of valuable dust, improves working conditions and community relations.

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment

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Delta Mudding and Patching Compounds are used to eliminate fins at core joints and to repair core imperfections. They are easy to apply . . . quickly . . . uniformly . . . smoothly. Due to their high hot and dry strength characteristics they form a complete bond which eliminates the danger of gas leakage at core joints.

Smooth . .

NEW . . . IMPROVED . . . DELTA MUDDING & PATCHING COMPOUNDS

The new DELTA Mudding and Patching Compounds are faster, smoother and extremely easy to use. They are non-reactive with molten metal, will not expand or contract when dried, are highly refractory and have a high fusion point.

DELTA SLIKTITE — is a clean, smooth, ready to use plastic-type Mudding and Patching Compound for use on cores in the production of steel, gray iron, malleable and non-ferrous castings.

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Ask for working samples of the new, improved Delta Mudding and Patching Compounds. Be sure to specify SLIKTITE or EBONY. You will also receive complete instructions for use.

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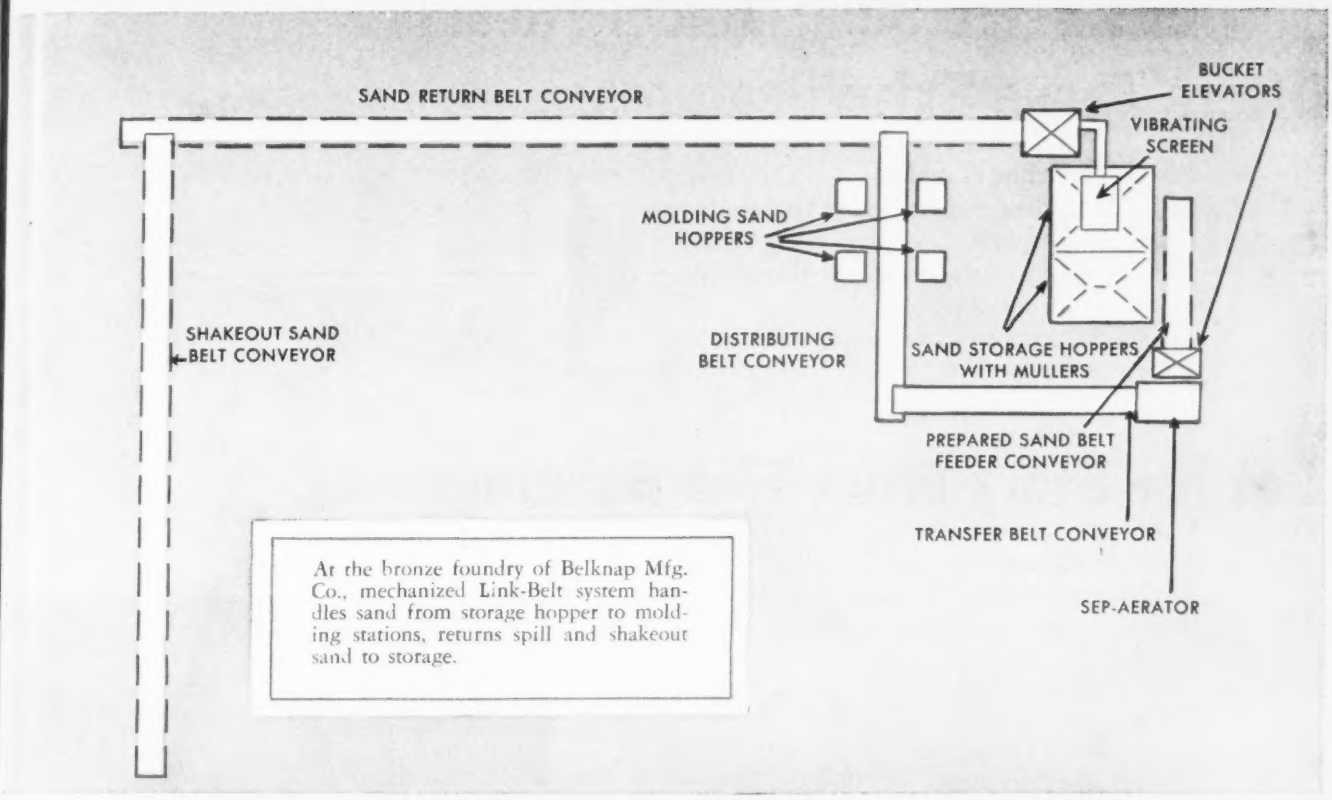

At the bronze foundry of Belknap Mfg. Co., mechanized Link-Belt system handles sand from storage hopper to molding stations, returns spill and shakeout sand to storage.

LINK-BELT mechanizes sand handling at 90-year-old bronze foundry

LIKE many other plants, the Belknap Manufacturing Company, Bridgeport, Conn., required increased production to meet postwar demand for its bronze valves. Yet labor shortages dictated an answer other than additional manpower. The solution: an unusual mechanization of their 90-year-old foundry, featuring a complete Link-Belt sand handling system. The results: typical Link-Belt economy and efficiency . . . improved casting quality . . . better working conditions.

Let a Link-Belt engineer demonstrate how modernized handling methods can increase production and reduce costs in your foundry. Simply call the Link-Belt office nearest you.

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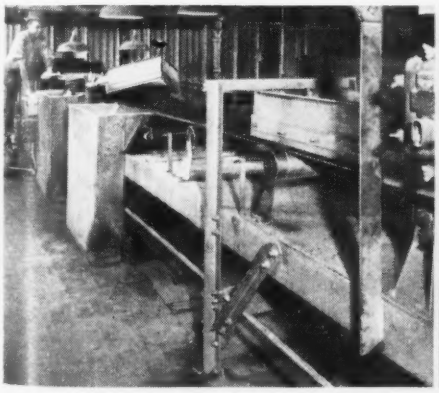
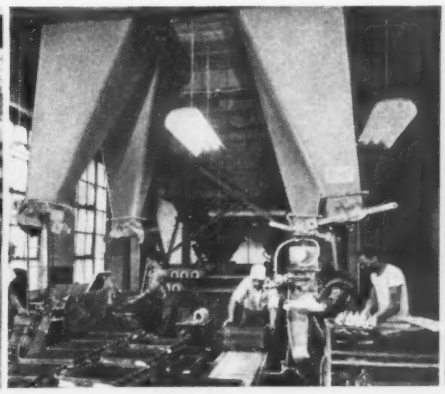
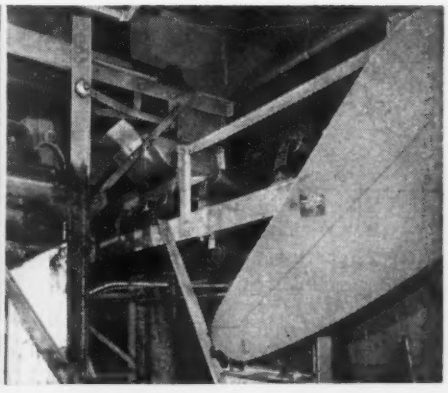


Distributing belt conveyor, 18 in. wide and 28 ft. long, receives sand from preparation unit via bucket elevator. Hand-operated plows then divert it to molding hoppers.



Link-Belt molding sand hoppers reduce molding time. Spill sand falls through grate onto belt conveyor. In background, two Link-Belt bucket elevators and storage bin.



Two belt conveyors return molding sand for preparation. Conveyor at top feeds spill sand onto lower belt which is returning shakeout sand. Series 100 idlers are used.

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle; Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices in Principal Cities.

13.33S

New BAKELITE TRADE-MARK Shell Molding Resin Offers These Extra Features:

Faster production of molds

Reduced tendency of resin-sand mixture to fall off pattern plate

Reduced tendency of molds to distort on ejection from pattern-plate

Smaller quantities of resin needed to reach minimum usable strength

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BAKELITE General-Purpose Resin BR-12011S has been specially developed to give greater latitude in mold-making. It can be subjected to a greater variation in operating conditions than ordinary shell molding resins. Shell molds reach minimum usable strength faster and retain strength longer at curing temperatures, permitting more leeway in curing time.

Shell molds made with this resin resist the tendency to distort upon ejection from the hot pattern plate, insuring better mating of mold halves. The molds also offer greater resistance to deformation during the pouring operation, resulting in castings that are more dimensionally accurate.

Mail the Coupon Today

and learn about the advantages of shell molding with BR-12011S, as well as the basic story of shell molding with BAKELITE Phenolic Resins. Bakelite Company engineers, located in principal cities, can offer expert advice and guidance in the proper selection and use of resins for shell molding.

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Please send me complete information on shell molding resin BR-12011S, together with the basic story of shell molding with BAKELITE Phenolic Resins.

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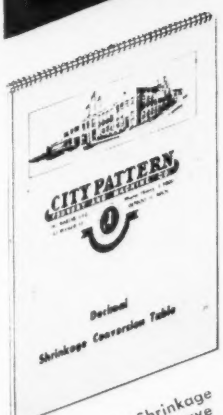
Bakelite Company (Canada) Ltd., Belleville, Ont.

THE LATEST METHODS FOR THE FINEST PATTERNS

Shown above is the woodworking shop at City Pattern where the crafting of accurate master patterns is a thoroughly efficient procedure. Here you find men who know every phase of pattern making and have practiced it to its finest skill. The latest lighting techniques promote painstaking accuracy without undue eye strain . . . an accoustical ceiling deadens noise for careful concentration without fatigue . . . the latest woodworking equipment assures maximum economy in every step of the procedure.

These are but a few of the reasons why leading manufacturers rely on City Pattern for the utmost in accuracy, economy and production utility in wood and metal patterns.

SETTING THE PATTERN IN PATTERNS



City Pattern's Shrinkage Conversion Tables save time and eliminate errors in shrinkage calculations. Your letterhead request will bring one without obligation.

CITY PATTERN
FOUNDRY AND MACHINE CO.

1161 HARPER AVENUE
DETROIT 11, MICHIGAN

HOW

WHEELABRATOR® STEEL SHOT Strikes a

Cleanin

LESS ABRASIVE CONSUMPTION

General Heat Treating Co., Syracuse, N. Y. is able to clean 217 lbs. of heat treat work for every pound of Wheelabrator Steel Shot consumed, compared to only 34 lbs. of work cleaned per lb. of malleabilized grit formerly used.

INCREASED PARTS LIFE

At a progressive Eastern Steel Foundry the use of Wheelabrator Steel Shot resulted in a 150% increase in blade life with a corresponding increase in the usable life of other machine parts.

LOWER CLEANING COSTS

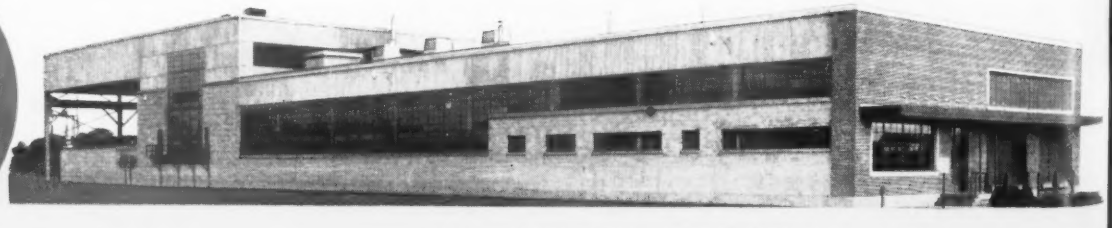
A large New York gray iron foundry slashed abrasive costs from $2.49 per hour to $1.54 . . . a 38% reduction . . . when they switched from chilled iron grit to Wheelabrator Steel Shot.

LESS MAINTENANCE LABOR

Due to the 300% increase in machine parts life resulting from the use of Wheelabrator Steel Shot, maintenance labor costs were slashed at a prominent Eastern plant.

REDUCES SHIPPING, HANDLING AND STORAGE COSTS

American is the only Blast Equipment Manufacturer Producing Steel Shot



AMERICAN'S STEEL SHOT PLANT

The HEART of Your Cost Reduction Problem

19 CONTROL CHECKS FOR QUALITY ASSURE PEAK PERFORMANCE

It took a new plant and new production methods, unique in the industry, to produce this properly balanced, metallurgically superior steel shot. 19 control checks insure the highest standard of uniformity in structure, hardness, solidity, toughness, size and shape. This meticulous attention to every phase of production is your assurance that Wheelabrator Steel Shot will provide peak performance and economy for your cleaning operations.

Another American FIRST

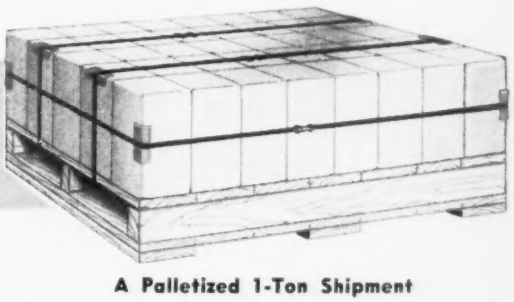
50 LB. CARTONS and PALLETIZING

For Safety - Convenience - and Lower Cost to You

Wheelabrator steel shot is now packaged in strong, easy-to-handle 50 lb. cartons—more rugged and durable than antiquated burlap bags (100 lbs.). Shipments of 1 Ton or more are securely strapped to expendable pallets (40 cartons to a pallet) for safer transportation and easier handling and storage. *All at no extra cost!* Another "plus" for Wheelabrator Steel Shot — the modern blasting abrasive.

Easy-to-carry, easy-to-pour, this new carton reduces strain and fatigue in abrasive handling.

50 lb. carton



A Palletized 1-Ton Shipment

Send for Bulletin No. 89

Bulletin 89 tells the complete story about "Wheelabrator" Steel Shot and what it means to the user in terms of performance and economy. Write for your copy today.

THE AMERICAN MOLDER

American

WHEELABRATOR & EQUIPMENT CORP.

505 S. Byrkit St., Mishawaka, Indiana

Here's Why KANSAS CITY HAY PRESS CO. Has Ordered BS&B Foundry Flasks for 14 Years

These BS&B Foundry Flasks at Kansas City Hay Press show how BS&B is able to meet special customer requirements with standard units . . . often at a big savings in time and money. In this case, BS&B used standard FP17 Flasks, ¼" thick, and added a special outside sand strip to allow conveyor handling without handles! Let a BS&B salesman tell you more about one way BS&B Foundry Flasks may lower operating and maintenance costs for you.

Some of the BS&B Foundry Flasks, Model FP18, in use at Kansas City Hay Press. These flasks are 5/16" thick, and are 27" x 38" x 8".

This general jobbing foundry, located in Kansas City, Mo., uses *all* BS&B Foundry Flasks. Producing grey iron and semi-steel castings, this well-equipped foundry has been buying light to medium-heavy flasks, bottom boards and core plates from BS&B for right around 14 years!

Like other successful foundries, Kansas City Hay Press knows that the secret of a profitable operation is to keep operating and maintenance expenses low. They learned, long ago, that BS&B Foundry Flasks practically *guarantee* good castings . . . and the Kansas City flood *proved* the way BS&B Foundry Flasks can take it! E. C. Sooy, who operates the foundry, will tell you that there was no pitting, corrosion or damage caused to the flasks by flooding, even though they were under water for several days!

Time after time, BS&B Foundry Flasks prove their worth and serviceability under extreme conditions—because BS&B Foundry Flasks are designed by foundrymen, built to meet the most exacting specifications.

Only BS&B Heavy Duty Flasks Offer You All 3!

1. Bearing strips, continuously welded, both inside and out.
2. Cast steel trunnions.
3. Cast steel pinlugs and clamplugs.

Write for FREE BS&B Foundry Flask Handbook

A handy catalog and useful foundryman's "Bible" — includes valuable information on foundry flasks and easy-to-order system.

BLACK, SIVALLS & BRYSON, INC.
Foundry Flask Division, Dept. 7-AR9
7500 East 12th St., Kansas City 26, Mo.

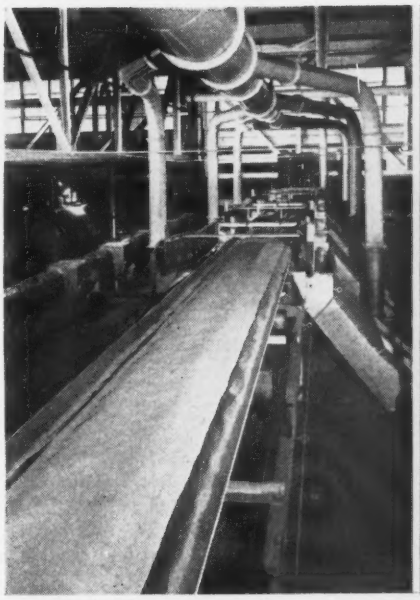
FOUNDRY — OUR 60TH YEAR — BS&B FLASKS

NEW FORD FOUNDRY EQUIPPED WITH 7 MILES OF GOODYEAR BELTING

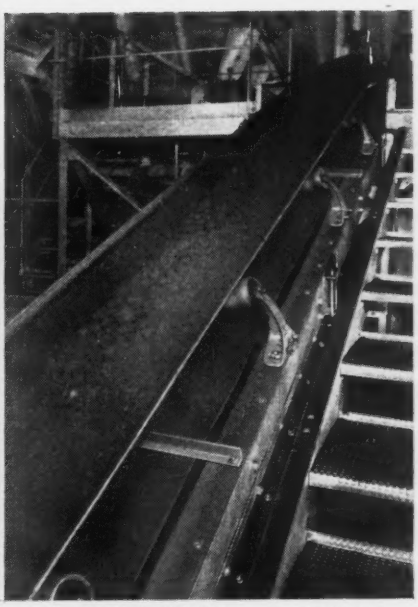
ONE of the largest and most modern foundry plants in existence, the new Ford Cleveland Foundry, is equipped with Goodyear Conveyor and Elevator Belting—7 miles of it. Many of the belts were spliced by vulcanization on the spot.

Belting for each installation was specified by the G.T.M.—Goodyear Technical Man—after he was called in by The Cleveland Foundry group, which did all design, layout and engineering for the new Ford plant.

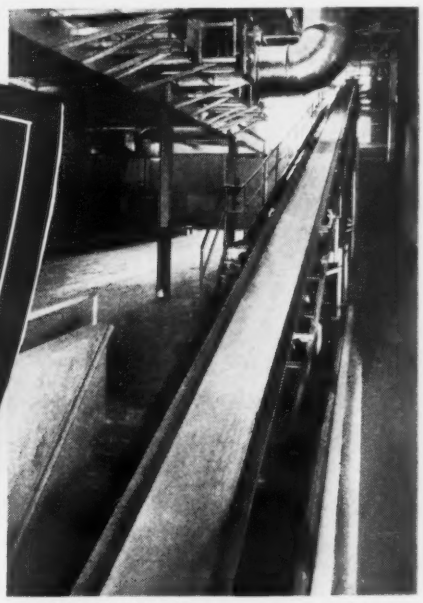
In any foundry operation, it will pay to consult the G.T.M. *first* about belting requirements, for he knows rubber in all its forms better by far – your assurance of long, trouble-free service. You can reach him through your nearest Goodyear Distributor, or by writing:
Goodyear, Mechanical Goods Division, Akron 16, Ohio.



HOT LOADS ride on Goodyear Glass Carcass Conveyor Belting designed to handle materials in the very-high-temperature range.



ABRASION PROBLEMS are met with Style B Goodyear Conveyor Belts. Nearly 32,000 feet of Style B are in use handling abrasive materials.



OILY MATERIALS are easily handled by Goodyear-designed CHEMIGUM Belting—which resists swelling far better than ordinary rubber covers. CHEMIGUM also resists oil far better than many other "oil-resisting" synthetics.

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

Chemigum—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

Shoveloader does 8 BIG JOBS at FARGO FOUNDRY, Fargo, N. D.

A tractor-mounted Shoveloader with ¾ yard bucket is one of the most useful tools at Fargo Foundry Company. Here are 8 of the important jobs it performs:

1. Picks up and transports sewer rings and covers (illustrated).
2. Handles foundry sand, loads it into dump trucks.
3. Picks up short pieces of steel flats and rounds at shears in yard and hauls them to fabrication points.
4. Picks up and transports gray iron castings as they come from foundry and loads them on out-going trucks.
5. Picks up tank heads and transports them to the assembly line.
6. Hauls big steel plates from yard into foundry.
7. With scraper attachment, levels back yard where refuse from cupola is placed, levels out parking lot and utility road.
8. In winter, with large snow bucket, removes snow from yard, parking lot and roadway.

Tractor-mounted Shoveloader gives you more efficient bulk handling at lower cost. Prices for ⅜ yard Shoveloaders start at $2332 (f. o. b. factory) including tractor.

write for Bulletin AD-32-B or contact your Baker-Lull distributor for complete information.

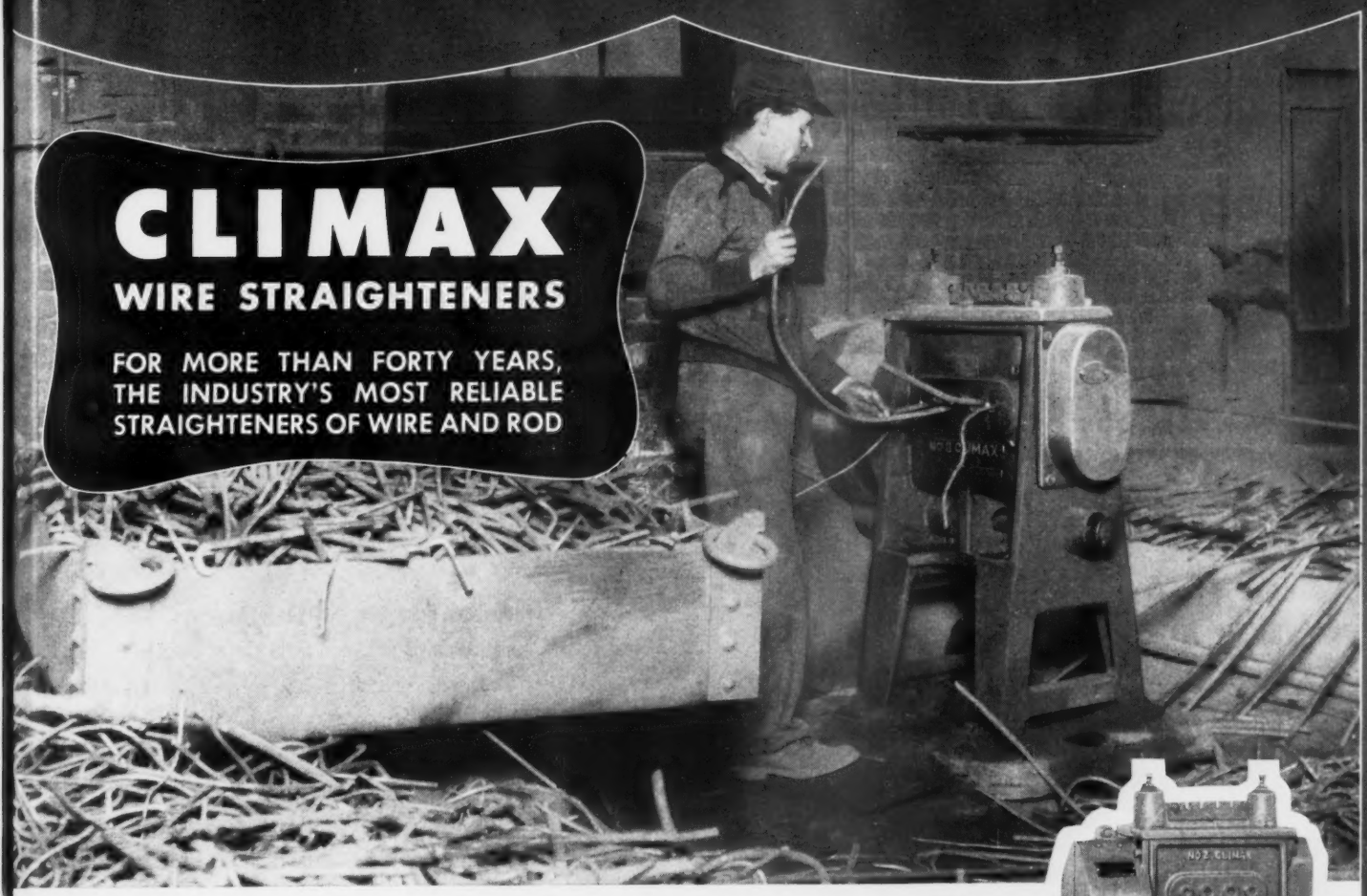
THE BAKER-LULL CORPORATION
Formerly the Lull Manufacturing Company

325 WEST 90th STREET • MINNEAPOLIS 20, MINN.
A Subsidiary of the Baker-Raulang Co., Cleveland 2, Ohio

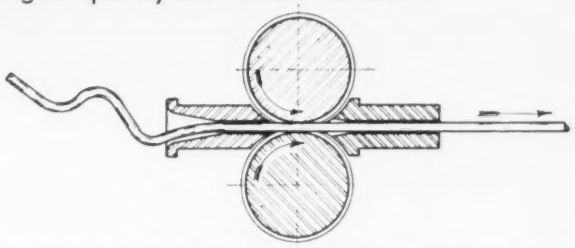
Baker Lull
handling equipment

CLIMAX
WIRE STRAIGHTENERS

FOR MORE THAN FORTY YEARS, THE INDUSTRY'S MOST RELIABLE STRAIGHTENERS OF WIRE AND ROD

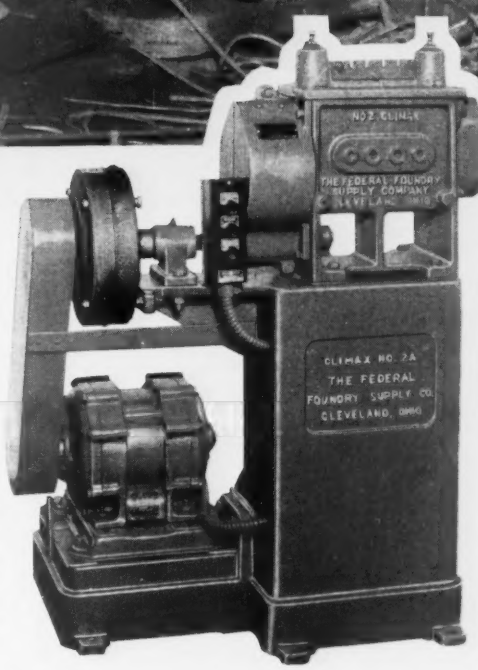


Reclaim your used core rods and wires and save money—with the CLIMAX. Operated safely and efficiently by unskilled labor. Straightens random lengths quickly and economically.



Bent wire is first checked in guide slots at top of the machine to determine proper feed hole, then inserted in feed hole, straightened between two heavy, alloy steel rolls under spring tension and ejected at back with a slight, natural bend, just right for core rod use.

Safety for the operator, as well as long life for the machine, is insured by enclosing gears and other moving parts. On motorized units, V-belts are enclosed and electrical wiring protected. Conveniently mounted controls and a reversible magnetic switch provide full protection for operator and straightening rolls, by enabling operator to stop or reverse machine instantly.



MODEL 2A
motorized

Handles 4 wire sizes, 1/16" to 1/4". A complete unit, ready for operation when connected to current supply.

MODELS AVAILABLE

The CLIMAX is offered in three sizes: to handle 4 wire sizes from 1/16" to 1/4"—4 sizes from 3/16" to 1/2"—and 5 sizes from 1/4" to 3/4". Each size may be furnished in three styles, as follows:

(1) Completely motorized—ready to operate.
(2) With gear reduction unit for your motor.
(3) With extended shaft for your own drive.

Write for additional information and prices, specifying wire sizes and model style.

FEDERAL

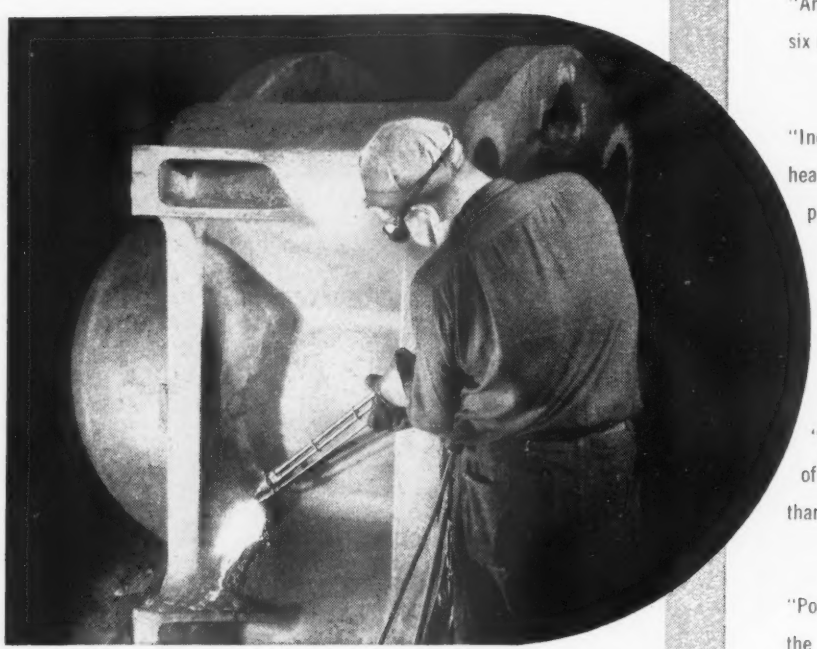
The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL, W. VA. · CHICAGO · CHATTANOOGA · DETROIT · MILWAUKEE · NEW YORK · RICHMOND · LOS ANGELES · UPTON, WYO.

POWDER-WASHING SPEEDS CLEAN-UP

Removes excess and defective metal quickly, easily, and at low cost



Cleaning-floor bottlenecks eliminated, production up, costs down, scraps and recasts negligible—that's the gist of enthusiastic reports on LINDE's powder-washing process.

Powder-washing combines the quiet speed of oxygen-cutting with a surface quality comparable to finish grinding. It removes fins, pads, sand inclusions, penetrations, burned core sand, chill bars, nails, chaplets, cracks and tears. It finishes flat or uneven surfaces to close tolerances with equal ease. And the powder-washing flame gets into places where other equipment can't.

Powder-washing can be applied to any carbon or alloy-steel casting. Equipment is simple. Technique is easily mastered in a short time.

For further details, telephone or write today. LINDE AIR PRODUCTS COMPANY, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Dominion Oxygen Company, Limited, Toronto.

WHAT DO FOUNDRYMEN SAY ABOUT POWDER-WASHING?

"... powder-washing does for us in two hours what required one day of chipping."

*

"An hour of powder-washing has replaced four to six hours of grinding."

*

"Increased production and reduced labor and overhead more than make up for the cost of gases and powder consumed."

*

"... the equivalent of four days' chipping in one and one-half hours."

*

"... a casting which formerly required one hour of grinding is cleaned by powder-washing in less than five minutes."

*

"Powder-washing cleaned one casting in an hour, the other in 30 minutes. Conditioning by chipping and grinding would have taken three and two days respectively."

*

"... removed the shifted cores and penetrations with a saving of several hundred man hours."

*

"... in a few hours, cleaned up housings that otherwise would have had to be scrapped."

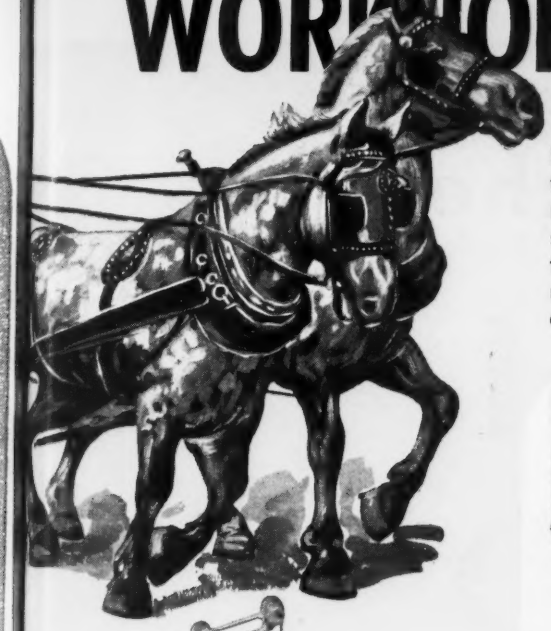
*

"... washed out a layer of sand from inside the cylinder in less than two hours, a job we could have done with no other available equipment."

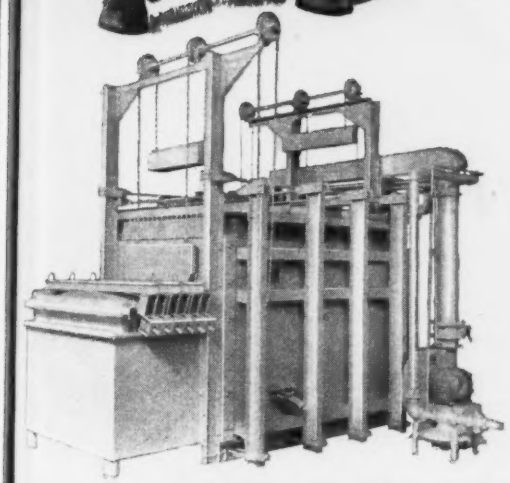
LOOK TO *Linde* Trade-Mark know-how . . . show-how . . . products and processes FOR WELDING, CUTTING, TREATING, FORMING METALS

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

WORKHORSES for ALUMINUM

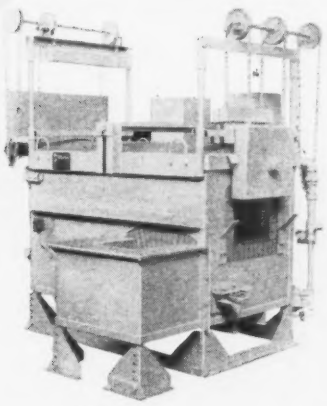


Here are the furnaces that bear the brunt of the burden in the aluminum foundry industry. They are designed for production of unsurpassed quality metal, in the fastest, most efficient and economical manner. Each has its specific purpose and capacity, meeting the exacting demands of sand foundries, die casters, permanent mold plants and smelters. They are recognized as the finest in the industry, reduce costs and make working conditions most agreeable. All furnaces may be fired by either gas or oil.



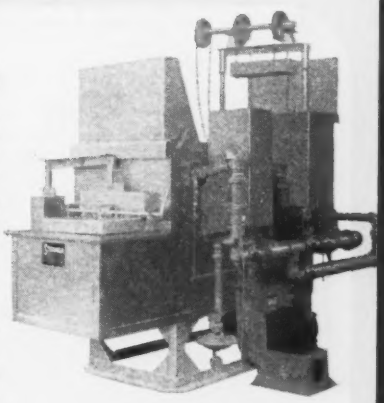
SMELTERS FURNACE

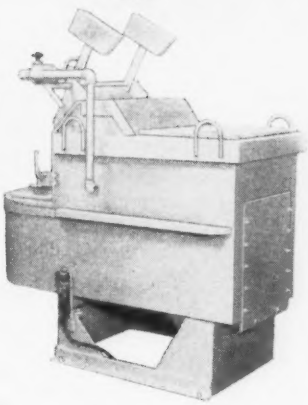
Built especially for smelters and other large melters. Easy charging, drossing, fluxing and alloying. Can be built to your own specifications. Capacities from 3000 lbs. Aluminum up.



MODEL "DC" FURNACE

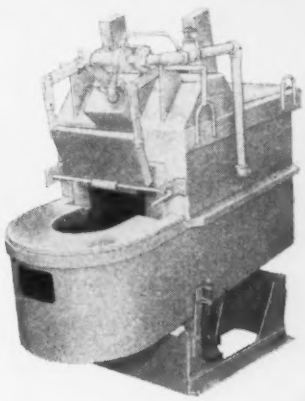
The 2 in 1 furnace. Breakdown and Holding in the same unit. Cold metal never reaches the molten bath. Assures metal of the finest quality on all classes of work. Close temperature control. Can be used as a sweat furnace for reclaiming inserts. Ideal for all types of plants including sand, permanent mold and die casting. Capacities from 350 lbs. Aluminum up.

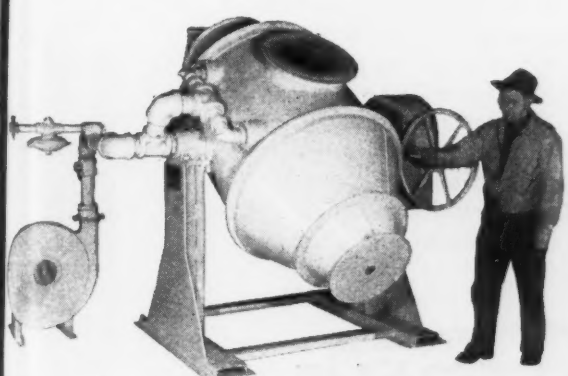




MODEL "DSC" DIE CASTING FURNACE

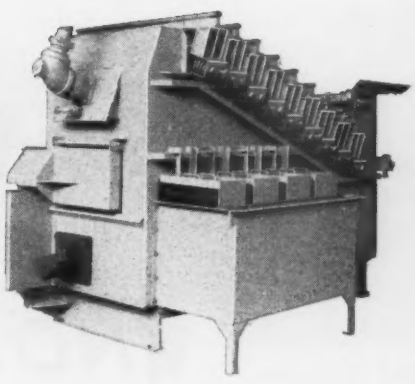
A small reverberatory furnace for melting and holding, or for holding only when hot charged at the die casting machine. Made in various sizes to meet your requirements.





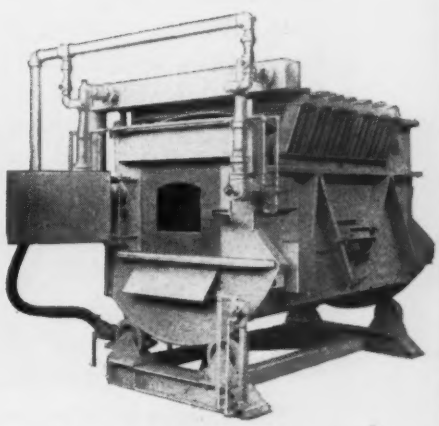
MODEL "BFC"

Hand tilt, open flame, barrel type furnace with flames firing tangent to inside of lining. Very fast melting. Used in all type plants including smelters. Capacities—500 lbs. Aluminum. A must for all aluminum jobbing sand foundries.



MODEL "MC" DIP-OUT TYPE

For melting and holding all in the same furnace. Hot metal always available. No iron pots or crucibles to replace. Capacities from 500 to 5000 pounds of aluminum.



MODEL "SW"—TILTING TYPE

Excellent to run back returns along with ingot required for permanent mold, die or sand casting operations. Also an ideal breakdown furnace. Capacities—600-1000-1700-3000 lbs. Aluminum.

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

Give gray iron the "TOUCH of GOLD" with CRYSTOLON* wheels

On your gray iron slow speed cleaning jobs you have lower production costs when you add the "Touch of Gold" with Norton CRYSTOLON vitrified wheels. Here you have the most effective combination of silicon carbide abrasive and vitrified bond for the most economical grinding of gray iron.

It's Grinding-Quality† That Counts

The most reliable way to gauge a wheel's value is by its *grinding-quality*†. Continuous research and testing by Norton has revealed a lot about the grinding quality of wheels. For example, the following table shows how CRYSTOLON vitrified wheels compared with competitive wheels of the same type when laboratory tested on the same gray iron application.

Wheel	Grinding-Quality†
Norton CRYSTOLON	10.0
Competitive Wheel A	8.6
Competitive Wheel B	7.0
Competitive Wheel C	7.9

The superior *grinding-quality*† of Norton vitrified wheels, as shown in this test, means real savings in your cleaning room. It assures you increased wheel life for a given rate of cut or better cut for equal wheel life or a favorable combination of both.

†A factor which takes into consideration both wheel and labor costs. It is directly proportional to grinding costs when the right grade of wheel is selected.

And remember: for *every* rough grinding job there's a Norton wheel that will cut your work and expense. That goes for every kind of metal, every type of equipment, and all grinding pressures, contact areas and speeds.

See Your Norton Distributor

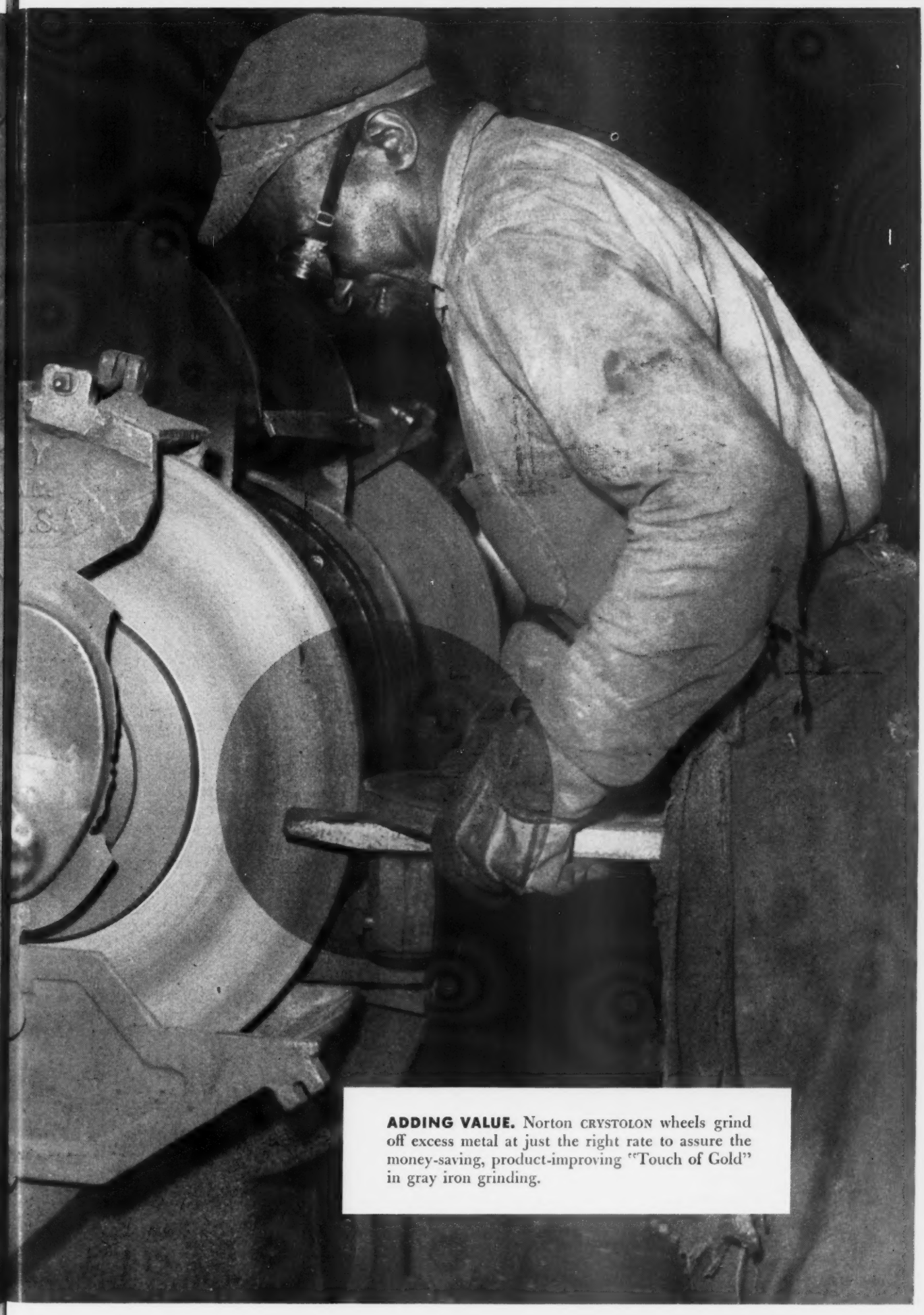
Besides his own long, practical experience in grinding applications, he can always call on a Norton Abrasive Engineer for special consultation. And both these members of the Norton family are backed by the pioneering and leadership of the world's largest manufacturer of abrasives. Ask for the booklet "Rough Grinding" — 54 pages of money-saving tips on *your* jobs. Or write us direct, NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your telephone directory yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

W-1523

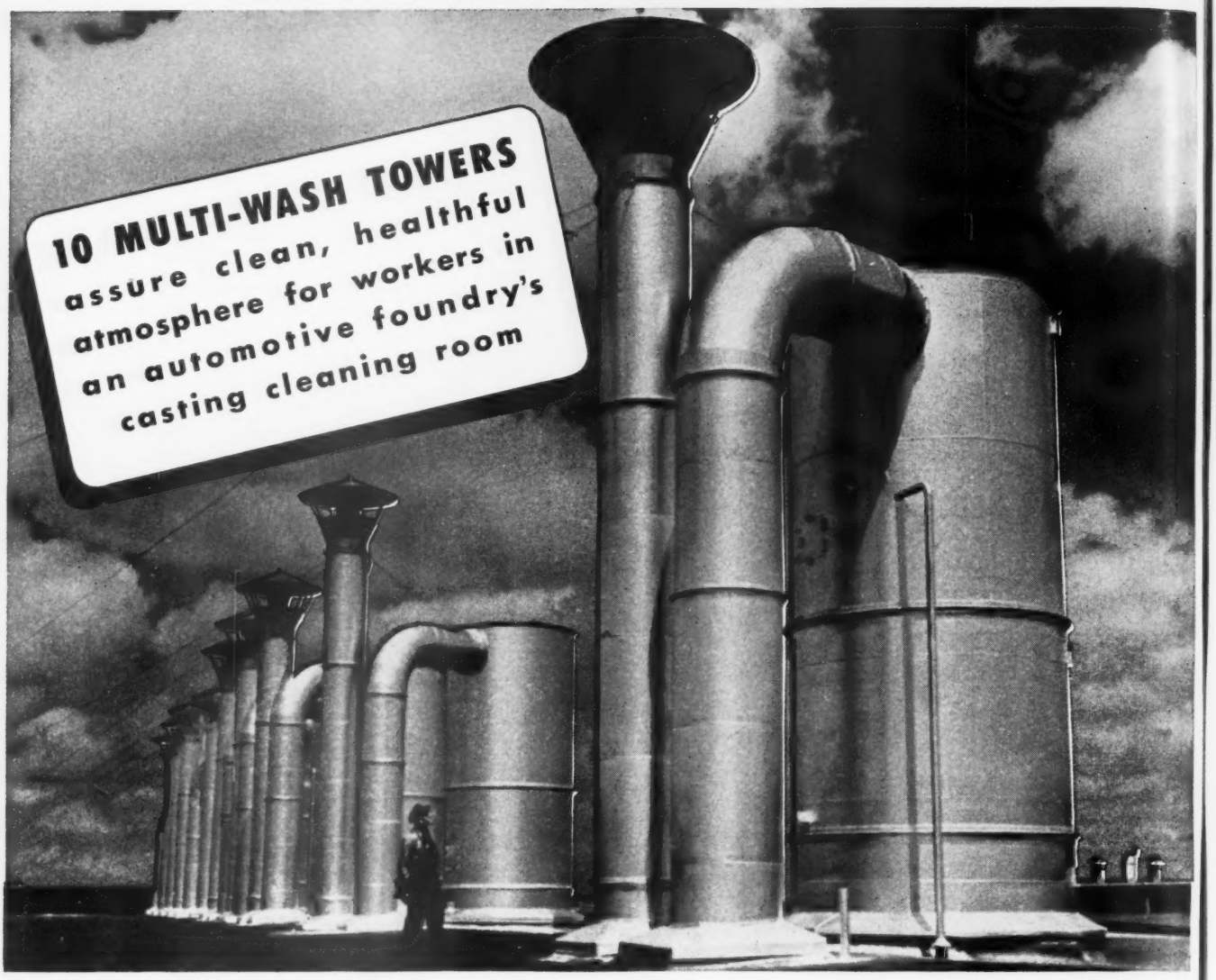
NORTON
ABRASIVES

Making better products... to make other products better

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries



ADDING VALUE. Norton CRYSTOLON wheels grind off excess metal at just the right rate to assure the money-saving, product-improving "Touch of Gold" in gray iron grinding.



This recent Schneible Multi-Wash installation is typical of many such systems that are today helping management get that extra worker incentive necessary to produce more and better castings. A noticeable lift to output and employee relations has been the result of providing clean, healthful surroundings through efficient control of foundry fumes and dirt.

These 10 Multi-Wash units, having a total of 130 washing stages, remove the dirt from 350,000 cfm of air every minute. Water, at the rate of 1500 gallons per minute, is recirculated through the system to remove and convey the collected material to a central disposal tank, which also serves 40 other Multi-Wash units.

Schneible patents cover all features that make Multi-Wash the only dust collector using the wet method principle, that provides multiple washing action and an efficiency rating of 99.9%, by actual scientific tests.

PRODUCTS:
Water Curtain Cupola Collectors
Multi-Wash Collectors • Uni-Flo
Standard Hoods • Uni-Flo
Compensating Hoods • Uni-Flo
Fractionating Hoods • Ductwork •
Velocitrap • Dust Separators •
"Wear Proof" Centrifugal Slurry
Pumps • Settling and Dewatering
Tanks • Entrainment Separators

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

CLAUDE B. SCHNEIBLE COMPANY
P. O. Box 81, North End Station
Detroit 2, Michigan

ENGINEERING REPRESENTATIVES IN PRINCIPAL CITIES

SCHNEIBLE

Late Foundry News

August 26, 1953

PIG IRON SOURCE: Of potential interest to the foundry industry is a research project started by the Bureau of Mines on utilization of so-called low-shaft blast furnaces. On the basis of European data, there may be a place for such units here for production of pig iron in much smaller quantities than is turned out by today's conventional large-tonnage units.

The low-shaft furnace, which is about one-half the height of the usual stack, may be adaptable to areas having small deposits of iron ore, a source of low-grade fuel, and limited pig iron consumption. Such consumers as foundries and nonintegrated steelmakers might want to install low-shaft furnaces to produce pig iron for their own use. The experiments will be conducted at the bureau's pilot-size blast furnace at Pittsburgh.

TAX WRITE-OFFS: Private industry is investing nearly $28 billion in approximately 18,000 new or expanded facilities for which rapid tax amortization has been approved so far by the government. Of this amount 61 per cent is eligible for the speeded-up depreciation. Foundries included among companies granted certificates recently include: R. & E. Foundry, Millport, N. Y., $95,000; Lebanon Steel Foundry, Lebanon, Pa., $71,000; Arneson Foundry Inc., Kenosha, Wis., $41,430.

ONE LESS FORM: No more NPAF-1 forms need be filed beyond the one covering the second quarter, NPA has announced. This quarterly report tabulated data on product shipments and the consumption of steel, copper and aluminum. If similar information is required in the future in connection with the defense program, it is expected that it will be compiled on an individual industry spot basis rather than through the collection of regular reports from all users of metals.

ACQUIRES FOUNDRY: Sheboygan Castings Corp., Sheboygan, Wis., has purchased the Sheboygan foundry division of the Cherry-Burrell Corp., Chicago, and will continue in gray iron jobbing work. Harry P. Rogers, Cherry-Burrell foundry manager, has joined Sheboygan Castings as general manager.

SMALL BUSINESS LOANS: All lending operations of the newly established Small Business Administration will be handled by the Reconstruction Finance Corp. for 60 days while the functions of the former Small Defense Plants Administration are being transferred to the new small business agency. Starting in early October SBA will take over. It will have the authority to lend up to $150,000 to applicants approved by the review board.

CANADIAN CONFERENCE: Plant visits and technical sessions are on the program for the third Maritimes Meeting of Eastern Canada Chapter, AFS, at St. John, N. B., Sept. 25-26. Subjects at technical sessions on Friday evening and Saturday morning will include high-strength aluminum castings, European molding methods, plastic patterns, shell molding, and use of rubber in pattern equipment. Chairman of the meeting will be George McAvity, vice president, T. McAvity & Sons Ltd., St. John, N. B.

SCHOLARSHIPS: National Malleable & Steel Castings Co., Cleveland, with the co-operation of the Foundry Educational Foundation, is establishing $3000 in scholarship funds this year at six schools. The scholarships are for $500 each at Case Institute of Technology, Western Reserve University, Rose Polytechnic Institute, Carnegie Institute of Technology, Purdue University and Illinois Institute of Technology. Recipients will be selected by the schools' scholarship committees.

X-RAY COURSE: A course in x-ray diffraction will be held by the X-Ray Department, General Electric Co., Sept. 14-18, in Milwaukee. The course, offered without charge, will be divided between laboratory and lecture sessions. Nationally known experts on the subject will give the lectures. Reservations can be made, and further information on this and future classes can be obtained, through J. J. Ludwig at the company's offices, 4855 Electric Ave., Milwaukee 1.

MAGNET RESEARCH: Indiana Steel Products Co., Valparaiso, Ind., large producer of permanent magnets, has been selected by the Air Force to conduct a comprehensive research program on magnetics to improve military air and ground devices utilizing magnets.

MACHINERY DIRECTORY: An addendum recently published brings up to date *The Directory of Metalworking Machinery* of the Department of Defense. Last revised in 1950, the directory

lists about 60,000 metalworking machines with data indicating descriptions, sizes or capacities, model numbers, expanded standard commodity classification code, and codes for manufacturers' names and model numbers. The directory and addendum are available through the Superintendent of Documents, Government Printing Office, Washington 25.

INGOT MOLD FOUNDRY: U. S. Steel Corp. has under construction a new mechanized ingot mold foundry at its Edgar Thomson Works, Braddock, Pa. Replacing an outmoded foundry at the same plant, the new facilities will have increased capacity and be able to produce larger molds.

FOUNDRY MANUAL: Bureau of Ships, Navy Department, has contracted for the revision of its *Foundry Manual*. Revision will include developments and improvements in foundry technology since preparation of the present manual. Purpose of the manual is to provide both training instruction and ready reference material to naval personnel engaged in foundry work on board repair ships and tenders and at shipyards and advance bases. Publication is expected next spring.

MISCELLANY: Eastern Non-Ferrous Foundry Co. is one of ten Philadelphia firms which have formed a small business production pool, incorporated as Allied Specialties Co., to seek defense contracts in the metalworking field . . . A new addition to the Yellow Springs, O., plant of Morris Bean & Co.'s aluminum foundry will bring total floor area to 88,000 sq ft . . Samuel A. Crabtree, assistant general manager of sales, Republic Steel Corp., is the new assistant administrator of the Metals & Mines Bureau, NPA. Recently director of the Iron & Steel Division, he is succeeded in that post by H. J. Wallace, sales vice president, National Tube Div., U. S. Steel Corp. . . . Harry L. Smith Jr., Aluminum Co. of America, has succeeded T. A. Lynch, Reynolds Metal Co., as director of the NPA Aluminum Division . . . Occupational accidents in 1952 cost American industry $45 per worker, according to the National Safety Council's annual *Accident Facts*. The year's toll was 15,000 killed, 2 million injured and 250 million man-days lost time . . . Werner Finster, 51, since 1948 chief metallurgist of Textile Machine Works, Foundry Division, Reading, Pa., died Aug. 13 after a brief illness.

PRICES OF FOUNDRY METALS AND COKE

(As of Aug. 26, 1953)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE

Connellsville	$16.50-17.00
New River	20.80
Wise County	15.95

OVEN

Birmingham	$21.65
Chicago	24.50
Detroit	25.50
Erie, Pa.	25.00
Everett, Mass.	26.00
Indianapolis	24.25
Kearney, N. J.	24.00
Milwaukee	25.25
New Haven, Conn.	23.45
Painesville, O.	25.50
Philadelphia	23.95
Portsmouth, O.	24.00
St. Louis	26.00
St. Paul	23.75
Swedeland, Pa.	23.85
Terre Haute, Ind.	24.05

PIG IRON

	(Per gross ton f.o.b. furnace) No. 2 Foundry	Malleable
Bethlehem, Pa.	$58.50	$59.00
Birmingham	52.88	....
Buffalo	56.50	57.00
Chicago	56.50	56.50
Cleveland	56.50	56.50
Everett, Mass.	63.25	63.75
Fontana, Calif.	62.50	....
Geneva, Utah	58.00	....
Granite City, Ill.	58.40	58.90
Lone Star, Tex.	52.50	52.50
Neville Island (Pittsburgh)	56.50	56.50
Steelton, Pa.	58.50	59.00
Swedeland, Pa.	60.50	61.00
Toledo, O.	56.50	56.50
Troy, N. Y.	58.50	59.00
Youngstown, O.	56.50	56.50

NONFERROUS INGOT

BRASS AND BRONZE: Red brass, No. 115, 24.50; tin bronze, No. 225, 35.25, No. 245, 29.50; high-leaded tin bronze, No. 305, 28.75; No. 1 yellow, No. 405, 20.75; manganese bronze No. 421, 25.25.

ALUMINUM: 99 per cent plus, primary ingots 21.50c. Secondary No. 12 alloy 21.75-22.50c. Deoxidizing grades: No. 1 23.75-24.00c; No. 4 20.50-21.00c.

MAGNESIUM: 99.8 per cent standard ingots 27.00c, f.o.b. Freeport, Tex.

COPPER: Electrolytic 29.00-30.00c, Connecticut valley.

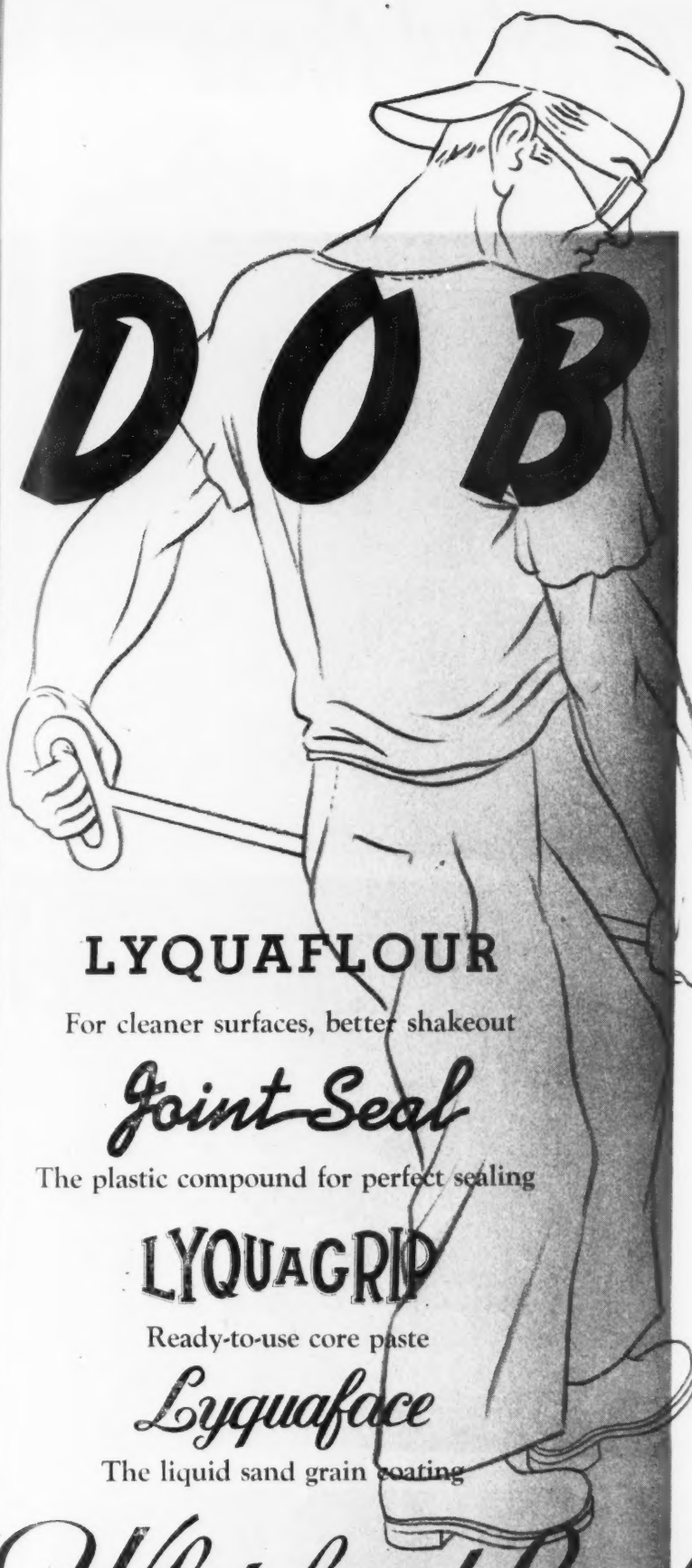
ZINC: High grade 12.35-12.85c, delivered. Die casting alloy 15.50c, delivered.

IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$31.00-32.00	**$39.00-40.00	**$30.00-31.00	.....	.....	.....	$45.00-46.00
Boston*	**32.00-32.50	**30.00-31.00	.....	.....	**38.00-39.00	.....	.....
Buffalo	43.50-44.00	**40.00-41.00	.....	.....	**44.00-45.00	.....	53.50-54.00
Chicago	41.00-42.00	41.00-43.00	.....	45.00-47.00	45.00-47.00	43.00-45.00	53.00-55.00
Cincinnati	43.00	45.00	40.00	.....	50.00	47.00	55.00
Cleveland	44.00-45.00	45.00-46.00	38.00-39.00	46.00-47.00	49.00-50.00	50.00-51.00	52.00-56.50
Detroit	37.50-38.50	43.00	29.00-30.00	42.00-43.00	.....	47.00	.....
Los Angeles	24.00	37.00-40.00	.....	.....	.....	.....	.....
New York*	35.00	32.00-33.00	.....	.....	.....	.....	.....
Philadelphia	42.00-43.00	38.00	41.00-42.00	.....	47.00-48.00	.....	.....
Pittsburgh	45.00-46.00	43.00-44.00	40.00-41.00	.....	49.00-50.00	.....	53.00-55.00
St. Louis*	43.00-44.00	41.00-42.00	35.00-36.00	44.00	.....	42.00-43.00	50.00-51.00
San Francisco	28.00	39.00	45.00	52.00	52.00	55.00	42.00-45.00
Seattle	31.00	**30.00-35.00	**30.00-35.00	.....	.....	.....	.....

* Brokers' buying prices. ** F.o.b. shipping point.

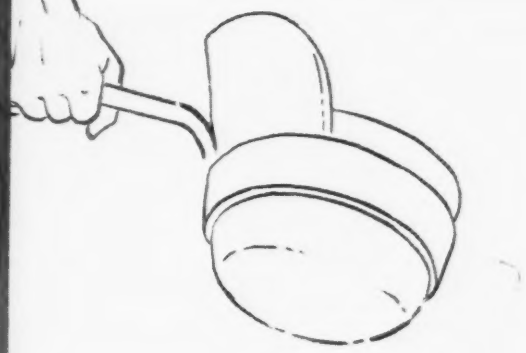


Established 1841

DOB-IT

A ready mixed, ready to use, labor saving core mudding compound

1. **DOB-IT** will not dry out in storage. There is no waste.
2. **DOB-IT** is extremely easy to apply.
3. **DOB-IT** has good facing value.
4. **DOB-IT** will not blow when dry. Has very low gas evolution.
5. **DOB-IT** contains no silica or other abrasive.
6. **DOB-IT** can be used for dry sand patching.
7. **DOB-IT** washes off hands easily.



8. **DOB-IT** makes an excellent patch for broken cores.
9. **DOB-IT** reduces mudding time by 30%.
10. **DOB-IT** requires no water or special mixing by coremaker.
11. **DOB-IT** is shipped ready to use.

You Owe It To Yourself To Investigate Our Claims.

LYQUAFLOUR

For cleaner surfaces, better shakeout

Joint-Seal

The plastic compound for perfect sealing

LYQUAGRIP

Ready-to-use core paste

Lyquaface

The liquid sand grain coating

Whitehead Brothers Company

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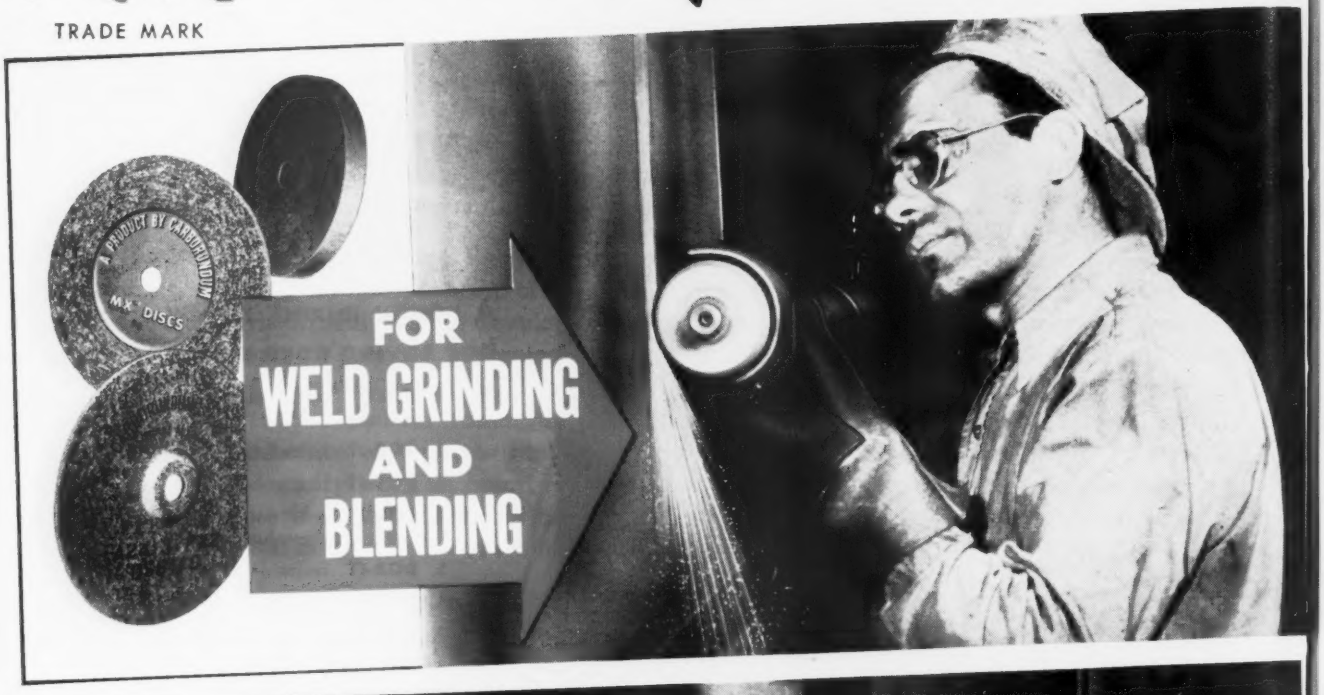
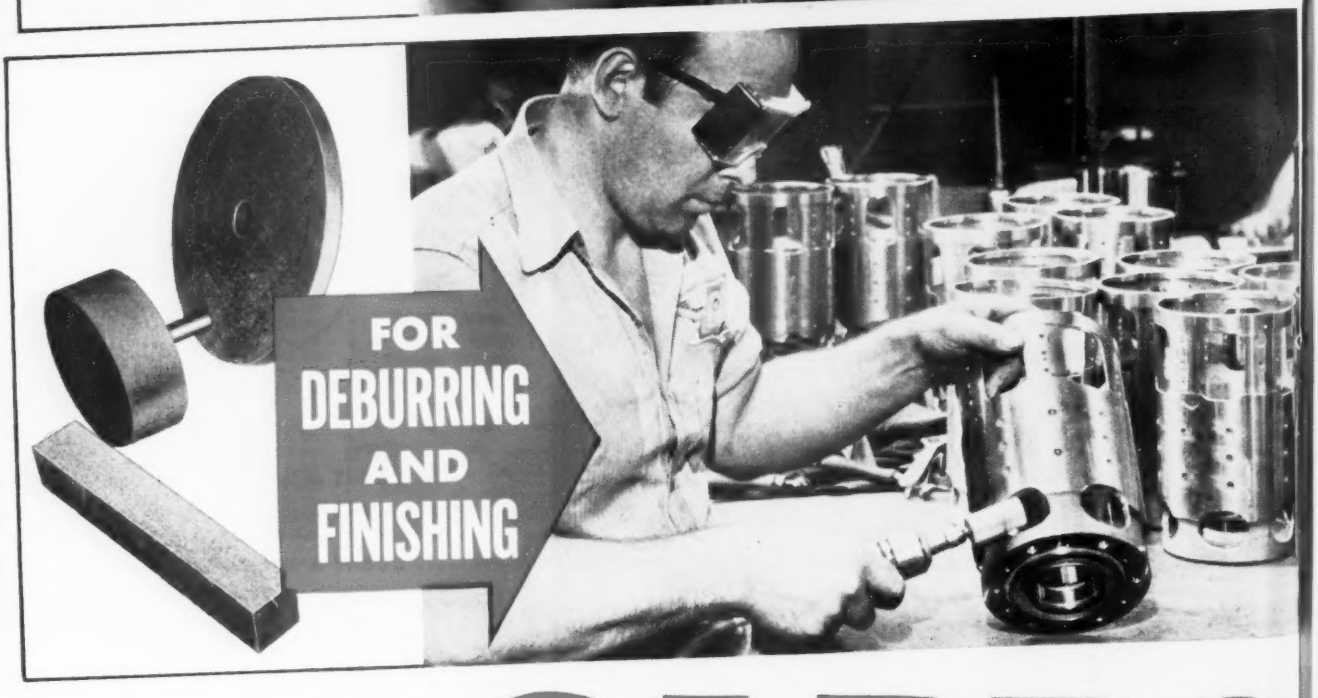
324 West 23rd St., New York 11, N. Y.

NEW ENGLAND OFFICE
17 Exchange Place, Providence 1, R. I.

MX Have you tried these abrasive products?

TRADE MARK

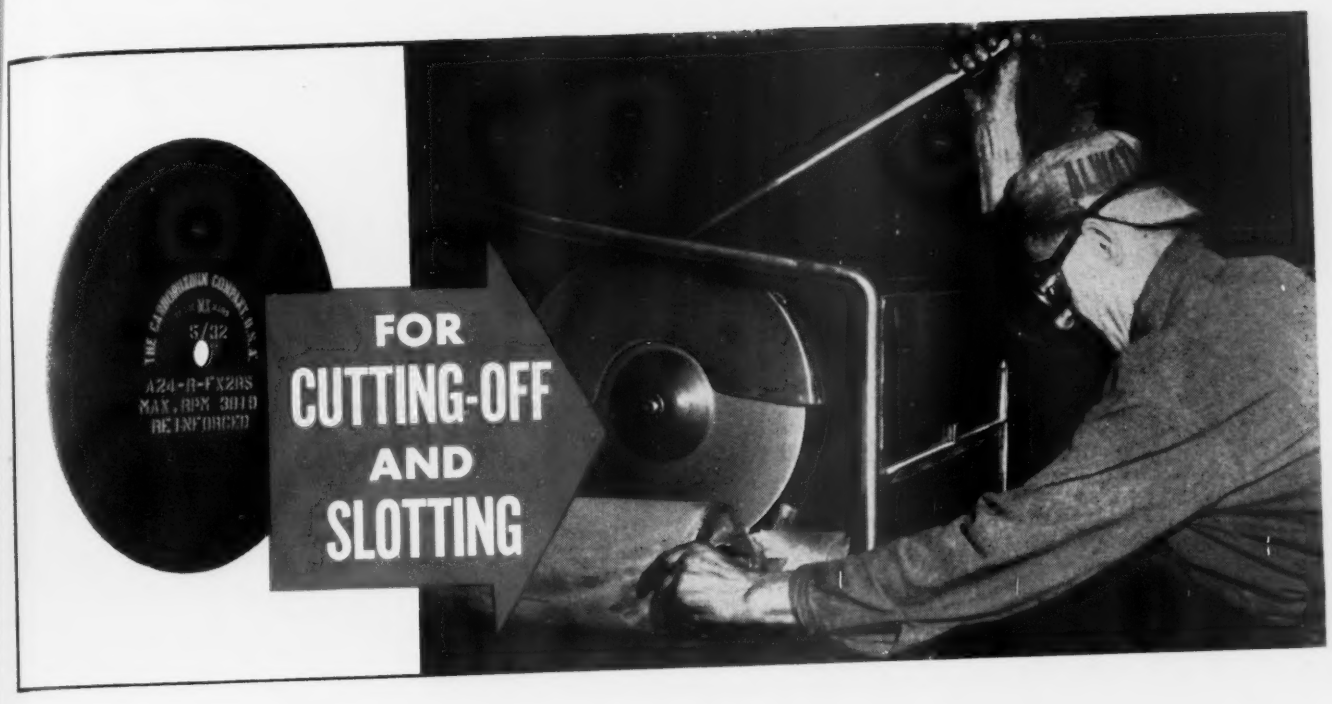




CARBO

TRAD MA

"Carborundum" and "MX" are registered trademarks which indicate manufacture by The Carborundum Company, Niagara Falls, N. Y.



Talk about versatility in grinding — MX products by CARBORUNDUM have it! For instance, one MX wheel reduces and blends rough stainless steel welds in one operation; another cleans out dainty decorative designs on sterling silver tableware; still another cuts through one inch black pipe in a matter of seconds. And these are but a few of the different kinds of work done by MX products every day!

MX abrasive products are in a class by themselves. They *finish* as they cut... they cut fast and clean... they resist loading — even on soft metals (they're tops for work on aluminum, for example), and alloys, or plastics, glass, and other non-metallics. They are *safe,* because of their high resistance to impact and heat shock. MX products work fast, wear slowly—remain usable right down to the arbor, shank or nut.

It's to your profit to find out what MX products can do for you — in any of these six forms: straight wheels, mounted wheels, cut-off wheels, discs, depressed center wheels, or sticks.

CALL YOUR CARBORUNDUM DISTRIBUTOR TODAY. He's your best bet for experienced counsel on the latest developments in the field. He carries complete stocks for prompt service. You'll find him listed under "Abrasives" in the yellow pages.

This "tell-all" booklet is FREE!

THE CARBORUNDUM COMPANY, Dept. AF 81-37
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YES! I'd like a copy of "MX Products"— Booklet No. 3.

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the ONLY source for EVERY abrasive product you need

81-37

...let's take a look at the 3F SIMPSON *MIX-MULLER* from the OPERATOR'S viewpoint

▶ *Put yourself on the mixer operator's platform . . .* and take a good look at the big-capacity 3F Simpson Mix-Muller from *his* viewpoint. He's interested in producing *big batches of uniformly high quality sand with a minimum of operating and maintenance attention.*

. . . And that's just what he gets with the 3F Simpson Mix-Muller. Specifically, here are some of the reasons why operators prefer Simpsons:

Easy access for adjustments and safe, routine maintenance . . . Vertical and radial plow adjustment easily made without entering mixer. Removable crib section permits all rotating machinery to be disassembled without disturbing foundation or overhead structures . . . and parts are removed in units without exposing gears or bearings.

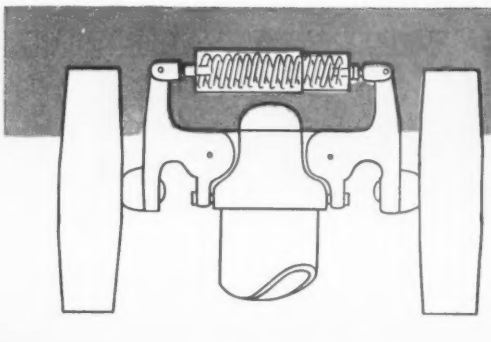
Safe, positive lubrication . . . Mullers and turret are grease-packed at the factory, and equipped with both labyrinth and friction type seals. Simple, dependable alemite centralized lubrication system serves mullers, rocker arm and turret—easily accessible from outside of mixer. Reducer is self-contained, splash lubricated.

Efficient utilization of power . . . Weight of the sand is carried on the bedplate, and discharge is handled by gravity through bottom doors—the only power required is that used to travel mullers over the sand and repile it in the muller path.

Most thorough mulling action ever developed . . . The comparatively lighter, *adjustable* mullers greatly increase the over-all efficiency of the mulling action, as the pressure can be adapted to the type of sand to be conditioned—and the 3F design permits handling at least 1/3 more capacity than previous models.

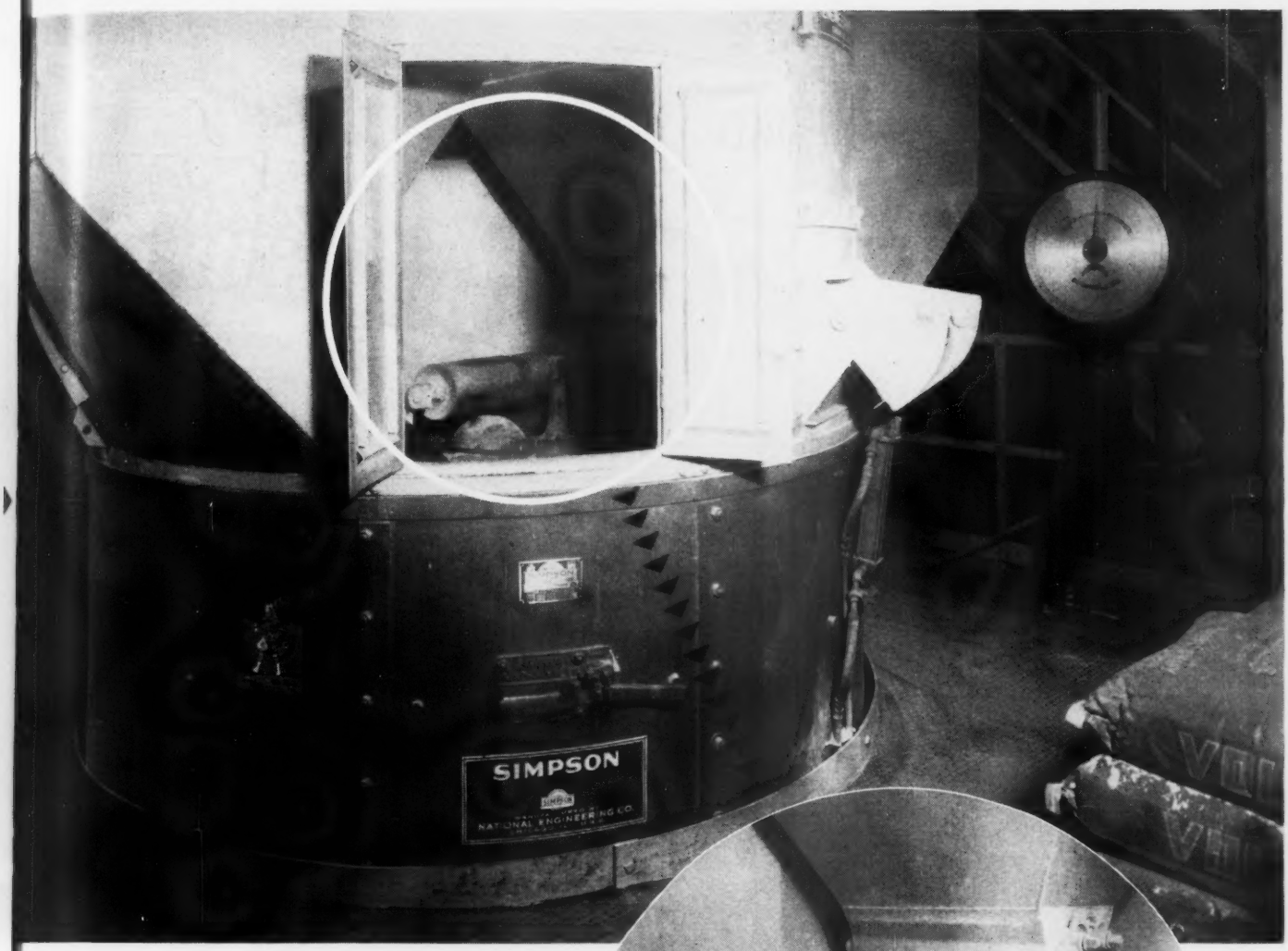
▶ Now, having examined the 3F Simpson Mix-Muller from the operator's platform, we think you can more readily see why these efficient units will give you greater tonnages of properly prepared sand . . . at lower operating and maintenance costs . . . and with fewer rejects, less scrap loss, and over-all improvement in casting quality.

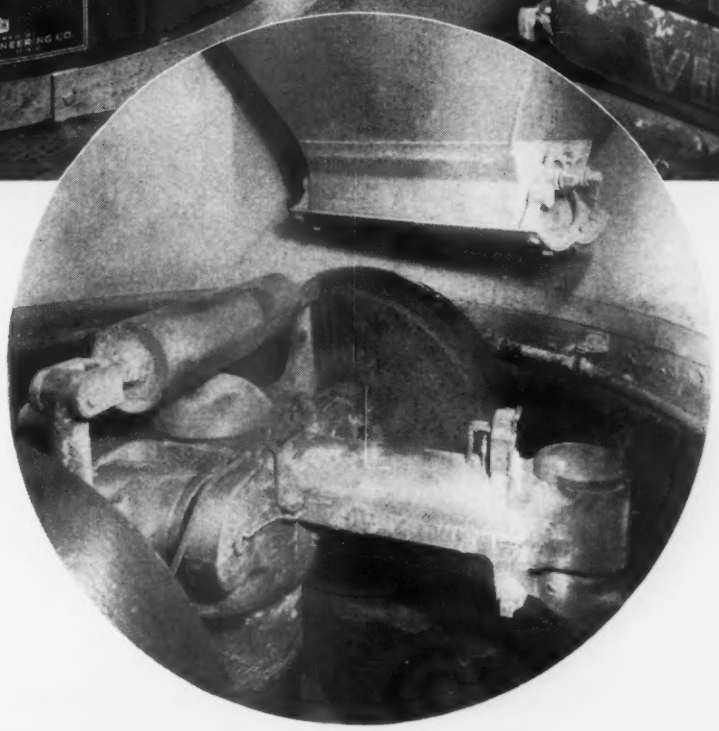
Let our engineers prove what these high production Mix-Mullers can do for you . . . Write for BULLETIN 511.



Advantages of SPRING-LOADED MULLERS . . .

◀▶ The spring loading arrangement of the mullers in the 3F Mix-Muller permits infinitely variable loading from 1,600 to 4,000 lbs. In the beginning of the mixing cycle the sand has little green strength and demands a light mulling weight. As the strength of the sand increases, the mullers rise and in turn exert a higher pressure on the deep sand bed beneath them. Because of the muller suspension and the plow design, the sand is subjected to much more violent agitation, and is considerably increased in volume. The agglomerate grains are broken up, any tendency to form "muller cake" is reduced, and a fluffy sand of high flowability results.





▶ *Here's the way the operator views the 3F Simpson Mix-Muller—in this case, at a large malleable foundry, where this high capacity unit is equipped with air-operated bond hopper and dust hood, charged from overhead batch hopper. The close-up view shows the streamline, dirt-tight design of the turret, spring-loaded mullers and rocker arm assembly, and part of the centralized lubrication system lines.*

SIMPSON
Intensive
MIX-MULLERS

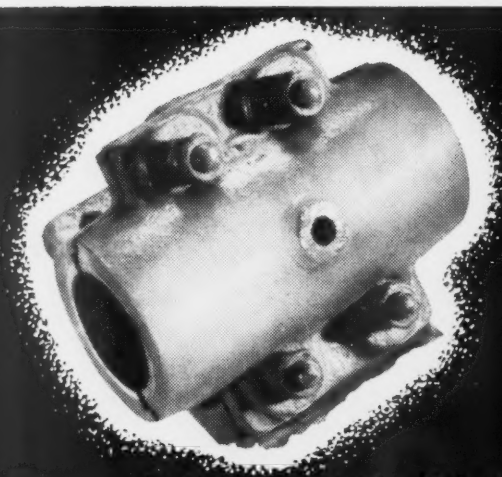
National Engineering Company

608 Machinery Hall Bldg. • Chicago 6, Illinois

Manufacturers and Selling Agents: For Continental European Countries—George Fisher, Ltd., Schaffhausen, Switzerland; for British Possessions—August's Limited, Halifax, England; for Canada—Dominion Engineering Co., Ltd., Montreal; for Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd., Sydney, for Argentina, Brazil and Uruguay—Equipamentos Industriais EISA Ltda., Sao Paulo, Brazil; for Mexico—CASCO ,S. De R.L., Mexico, D.F.

Why Brass can better serve your needs . . .

Time Tested Durability



YEARS OF CONTINUOUS USE WITH NO SIGN OF BREAKDOWN . . .

Years of human experience is adequate testimony that Copper Alloys effectively resist the destructive forces of time. Throughout the ages and especially today, Brass and Bronze Alloys coupled with skilful craftsmanship . . . consistently prove themselves best for applications involving continual use, constant strain and exposure to the elements. The Casting shown is a testimony of this fact.

FREE . . . Write for your copy of the 8-page Lavingot Technical Journal — Vol. 9, No. 2 — containing an article discussing "Why Castings Are Lost."

Specify—LAVIN NONFERROUS INGOT—*Quality*

Brass · Aluminum · Bronze · Zinc Base Die Casting Alloys

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• *Producers of Zinc Base Die Casting Alloys*

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R. LAVIN & SONS, INC. 1900 53 Years 1953 SERVING THE FOUNDRY INDUSTRY

WHEN IT COMES TO LININGS . . .

Quality counts!

THERE'S ONLY ONE HELSPOT

LADLES Lining is easy. HELSPOT comes in convenient slices, ready to tamp into place. Forms skimmer spouts, too.

CARRIERS The ease of installing, and long life, of HELSPOT . . . plus easy slag removal, makes HELSPOT a profit-builder.

SPOUTS The "lubricating" quality of HELSPOT causes metal to flow freely; slag formations that may cause bridging are held to a minimum. Metal stays cleaner.

HELSPOT is packed in 100-lb. waterproof cartons, already sliced for ease of handling. For those who prefer a dry material, HELSPOT DRY is available in 100-lb. bags.

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"Better Refractories"
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- √ Cleaner, more perfect castings when linings are made with HELSPOT!
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- √ HELSPOT is composed of Super-duty clays possessing high refractoriness.
- √ HELSPOT saves time in cleaning ladles; fewer repairs to linings required.

HELSPOT is an exclusive MEX-R-CO product designed for lining ladles, spouts, runners and metallurgical furnaces in grey iron, malleable iron and steel foundries and nonferrous shops wherein the refractory comes in contact with molten metal or slag.

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Gentlemen: Please send me complete information on HELSPOT.

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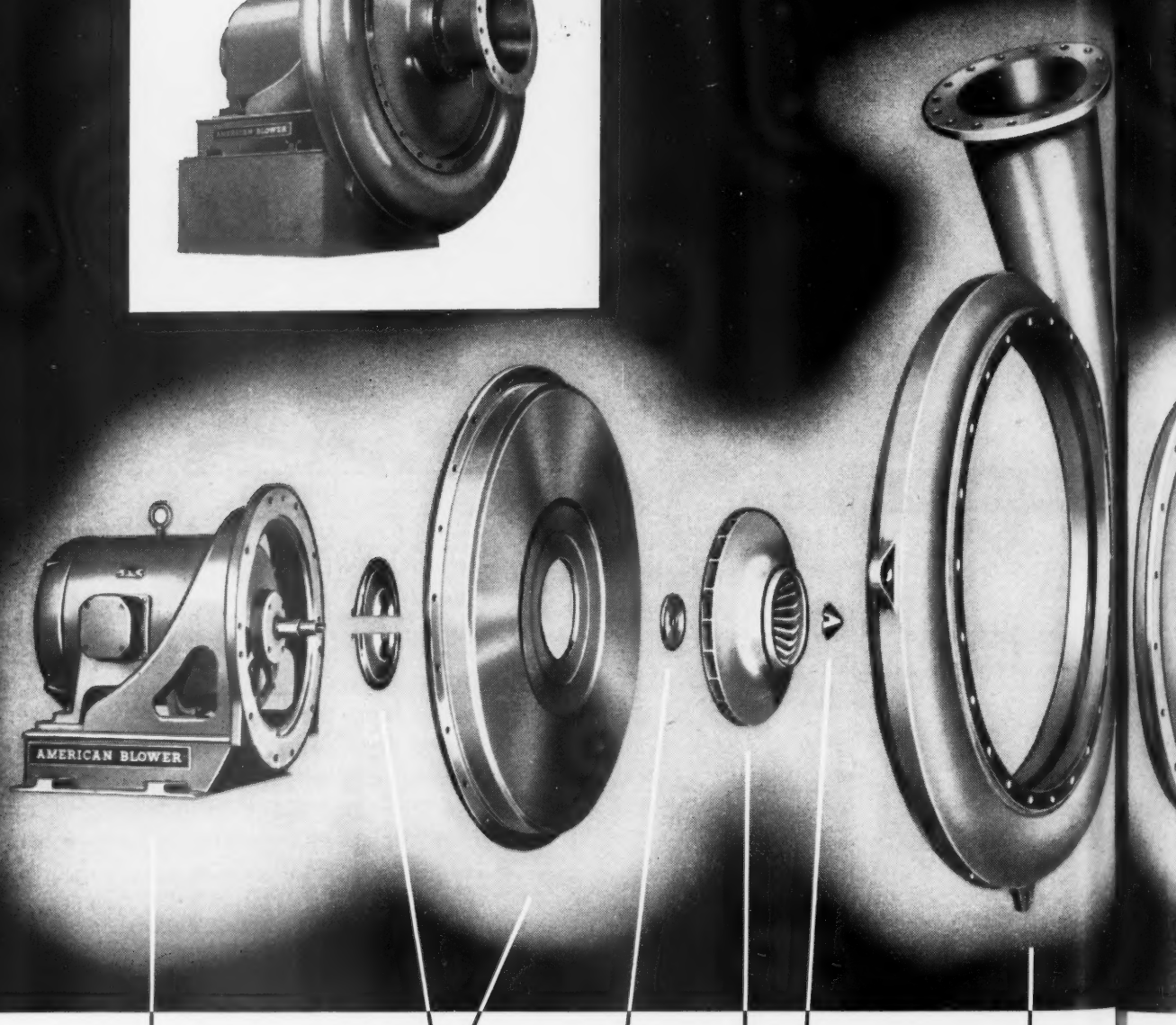
AMERICAN BLOWER

centrifugal c



Motor — Standard NEMA construction. Short motor shaft extension and conservative impeller loads assure operation below first critical speed of rotor assembly. **Baseplate** — heavy welded steel for rigidity and accurate alignment.

Shaft Packing — Nonferrous, cast construction. No mechanical contact between stationary and rotating parts. **Backplate** — cast iron, bolts with dowel fit to baseplate.

Spacer Disc

Impeller—Shrouded, single-piece, heat-treated, cast-aluminum alloy construction. Statically and dynamically balanced. Overspeeded to 20% above maximum operating speed before assembly.

Shaft Nut

Volute Casing — Cast iron construction. Bol with dowel fit to bac plate. Twenty-four cas positions available in eith direction of rotation.

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWE

Suction Cover—Cast-iron suction cover forms outer wall of diffuser passage and bolts with dowel fit to volute casing.

Annulus Packing—Permits accurate alignment with impeller during assembly. **Inlet Nozzle**—Provides uniform gas distribution. Flanged for standard pipe connections.

Designed for

EFFICIENCY

Built for

DEPENDABILITY

American Blower Single Stage Centrifugal Compressors offer several outstanding design features.

For example, the improved scroll design and deep diffuser passage efficiently convert velocity energy into pressure. Labyrinth annulus packing minimizes recirculation of gas around impeller inlet. Aerodynamic design of impeller blade inlets results in high efficiencies and dependable performance.

Before shipment, each compressor is thoroughly tested in accordance with A.S.M.E. Power Test Code for Centrifugal Compressors and Exhausters.

American Blower single stage units are available in sizes from 30 to 600 HP with pressures from 1¼ to 3¾ lbs. For technical data consult the nearest American Blower Branch Office or write us for Bulletin 109.

Whether you need equipment for heating, cooling, ventilating, air conditioning, vapor absorption, fume removal, dust collecting, mechanical draft, heat transfer or smooth power transmission thru Gyrol Fluid Drives — American Blower manufactures a complete line of products to meet your requirements. Helpful technical literature is available on each product.

AMERICAN BLOWER

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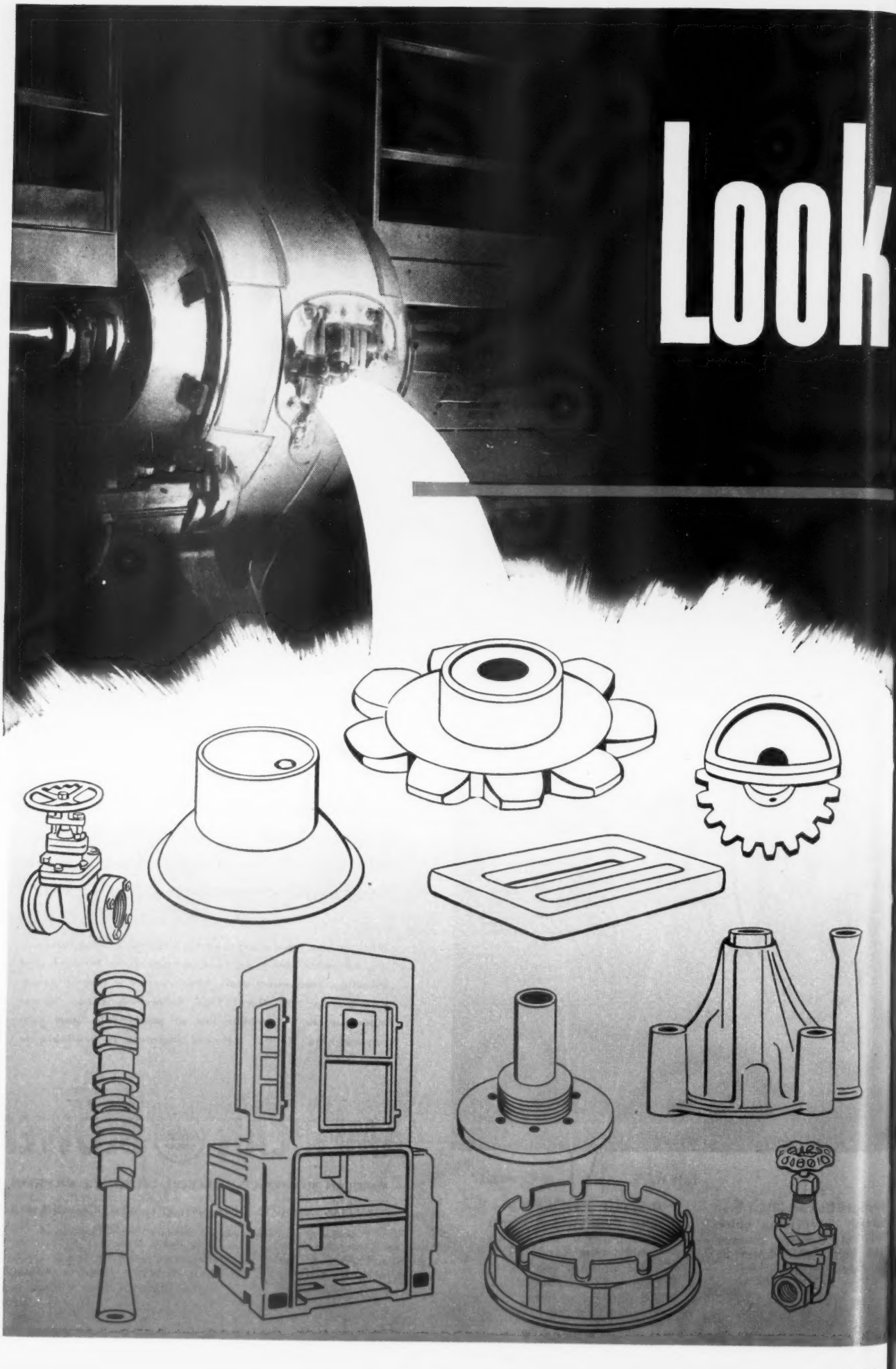
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary Corporation

CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS


Look

what comes out...

of Detroit ROCKING Electric Furnaces

These versatile furnaces provide uniform heats for an amazing variety of quality products

The day's work of Detroit Rocking Electric Furnaces in the nation's foundries ends up as valves, automotive castings, bases and component parts for machines, gears, rings, splines, bearings, bushings, electrical contacts. Shapes range from simplest to most complex. Metals, too, range the list—steel, bronze, brass, iron and their alloys.

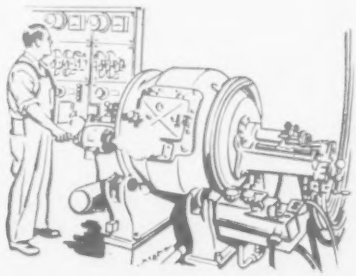
Wherever they are used, Detroit Rocking Electric Furnaces produce uniform, high-quality metal. When the pattern of operation is set, metal composition and melting cycle is duplicated in production heat after heat and day after day.

Rocking action of these furnaces delivers real advantages. The controlled motion means homogeneity of the metal. As the molten metal washes back and forth, it picks up heat from the refractory, increasing furnace efficiency and refractory life.

As for economy, here are some of Detroit Rocking Electric Furnace benefits: (1) optimum use of power; (2) reduced metal shrinkage; (3) more *usable* metal per melt; (4) fewer rejected castings; (5) more heats per day; (6) less out-of-production time since shells are easily replaced; (7) longer lining life; (8) longer furnace life.

Detroit Rocking Electric Furnaces may well be the best solution to your melting problems, too. Our engineers will work with you to give you facts on high efficiency, operating economy, and quality control, fitted to your production requirements. Write today!

Faster heats, better metal

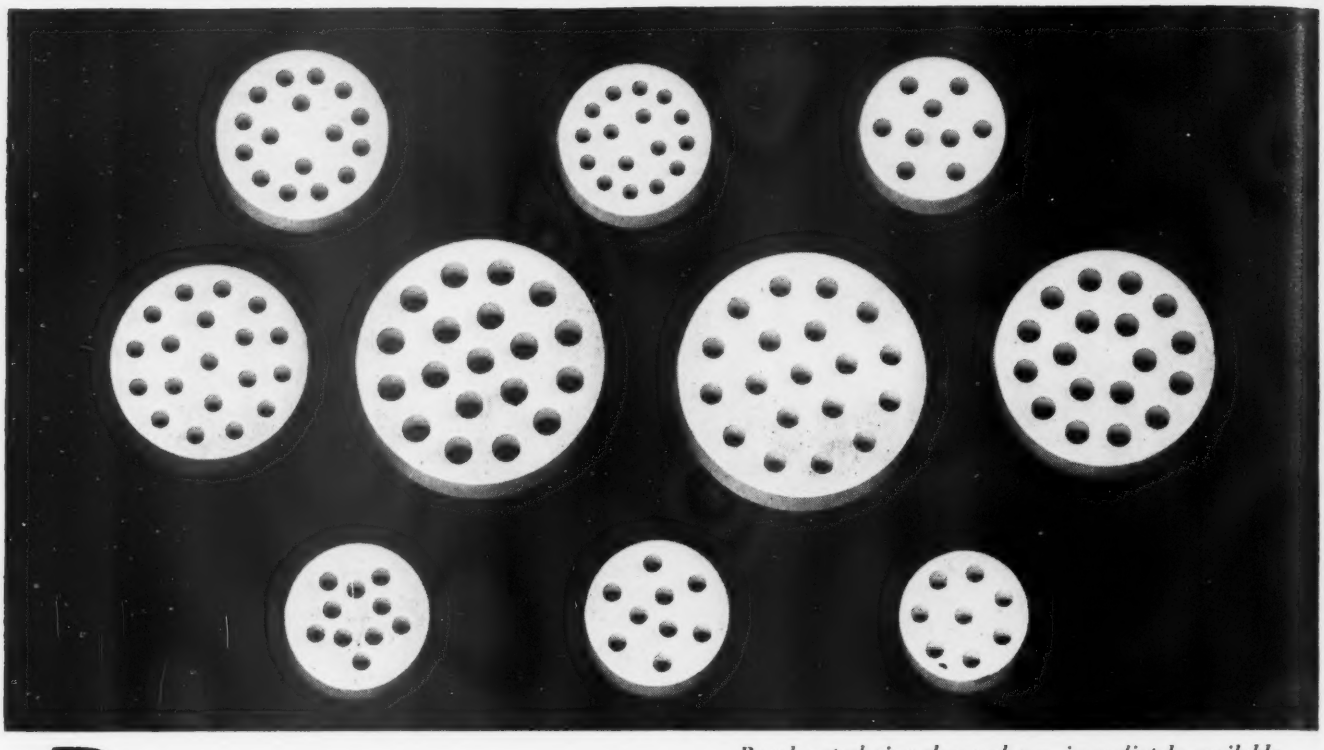


ROCKING ACTION DOES IT!

DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N.Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D. F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.

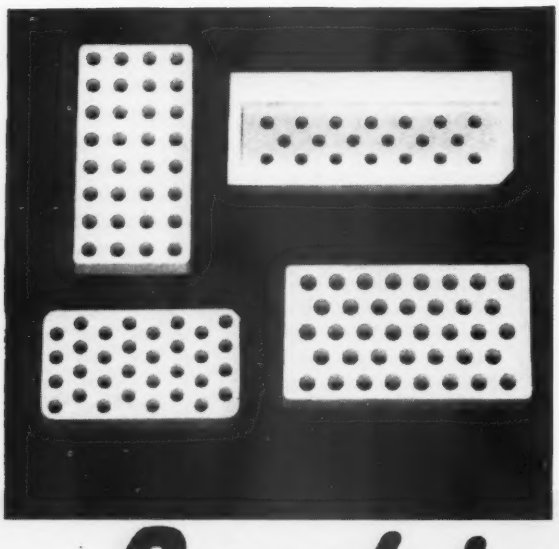


Regular stock sizes shown above—immediately available.

Positive METAL FLOW

...made possible with

PP INC. CERAMIC STRAINER CORES



Guesswork is eliminated and casting quality improved—where Porcelain Products Ceramic Strainer Cores are used. They provide a *positive* method of controlling pouring speeds. The holes in Porcelain Products extra high fusion point Ceramic Strainer Cores allow the molten metal to enter the mold at a pre-determined rate with no distortion or enlarging of pouring holes as experienced in oil bound cores through erosion and disintegration. Simply choose the strainer core that permits pouring at the rate you select, and control then becomes automatic.

There are more reasons, too, for using Porcelain Products Ceramic Strainer Cores. They turn out castings free from slag and sand inclusions—requiring less time in the cleaning room. They cut the number of rejects and reduce machining time. Porcelain Products Ceramic Strainer Cores withstand high heat, thermal shock, and can be stored indefinitely because changes in atmospheric conditions do not affect them. Available for immediate delivery in a wide variety of standard sizes. We also welcome inquiries on sizes designed to meet your special needs. Literature prints and samples available upon request.

Special sizes as shown at left produced to meet unusual specifications.

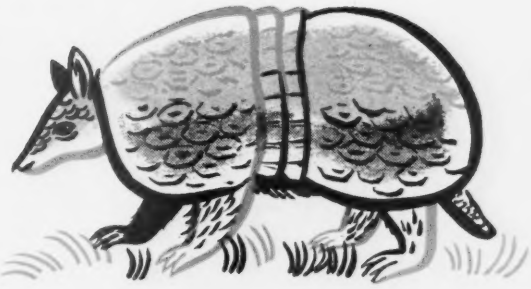
Porcelain Products, Inc.

FINDLAY, OHIO

Distributed by: BUFFALO, Wark Foundry Equipment Co.; CHATTANOOGA, The Fischer Supply Co.; CHICAGO, Peterson Foundry Supply Co.; CINCINNATI, The Buckeye Products Co.; CLEVELAND, The Nock Fire Brick Co.; DAYTON, The Fenton Foundry Supply Co.; DETROIT, Refractory Sales Co.; LOS ANGELES, Independent Foundry Supply Co.; MILWAUKEE Interstate Supply & Equip. Co.; PHILADELPHIA, Pennsylvania Foundry Supply & Sand Co.; ST. LOUIS, Refractories & Furnace Supply Co.; TOLEDO, The Freeman Supply Co.

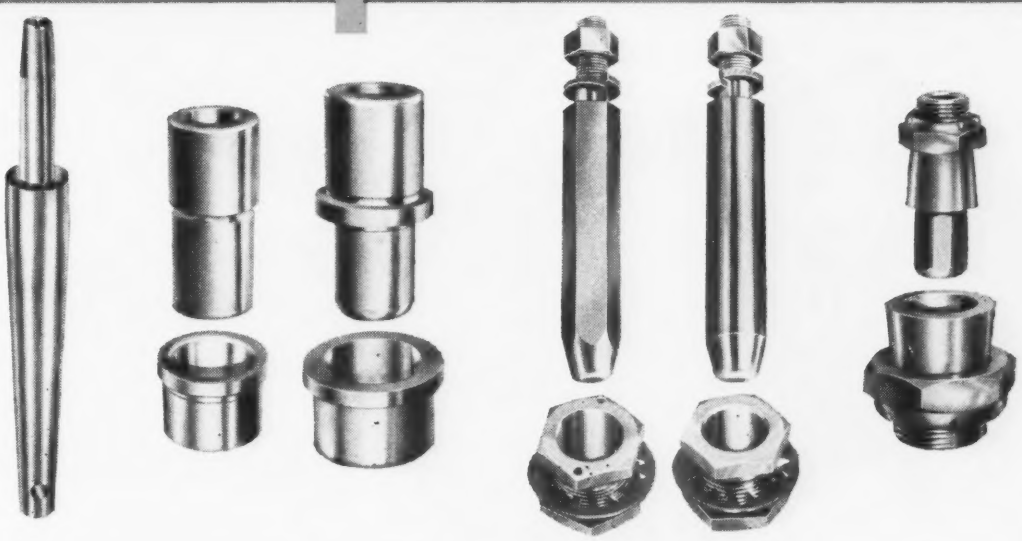
designed like an ARMADILLO

hardened wearing surfaces and ductile cores increase life of UNIVERSAL flask pins and bushings

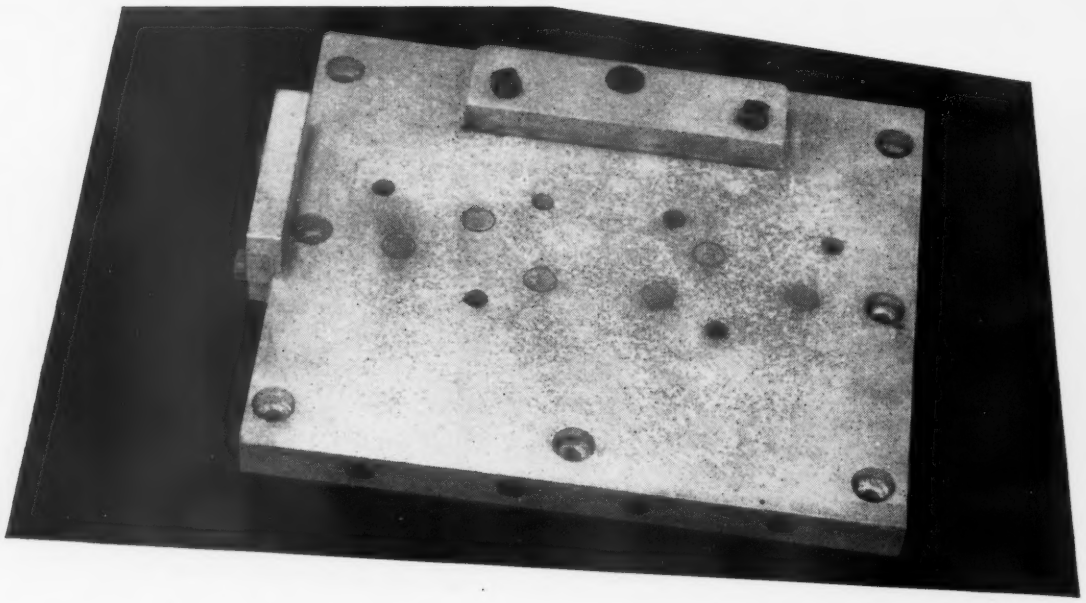


Universal flask pins and bushings are double quenched and double drawn to produce strong, ductile cores with a fine grain structure to enable them to withstand considerable stress, strain and rough treatment in the foundry without breaking or chipping. The wearing surfaces of both pins and bushings are carburized and hardened to improve their wearing qualities and prolong their life. Universal flask pins and bushings are precision ground to extremely close tolerances to help assure instant, accurate alignment of cope and drag. Plain or taper, round or hexagonal and threaded or plain types are available in a complete range of sizes. For complete information, write to the office nearest you — Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Avenue, Kenosha, Wis. — or the home office.

175



UNIVERSAL ENGINEERING COMPANY FRANKENMUTH 4, MICHIGAN



These core blower plates cost less

than those made of other materials. They're lightweight aluminum (Alcoa Aluminum Tool & Jig Plate) . . . available from stock in thicknesses of 3/8" to 4" and any dimensions up to 48" x 96".

Fully normalized, Alcoa Tool & Jig Plate is machined on both sides. Thicknesses are held to ±.010" —yet this aluminum plate is moderately priced, up to ½ less than those made of other materials. For full information on Alcoa Tool & Jig Plate, contact your local Alcoa sales office . . . or write Aluminum Company of America, 1949-J Alcoa Building, Pittsburgh 19, Pa.

Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

Casting with shell molds at Lynchburg Foundry Co., Lynchburg, Va.

Better surface finish, increased metal yield and up to 100% elimination of machining costs are advantages gained through shell molding.

Better Castings for Less Money...

With Shell Molds Bonded with Resinox

One of the reasons behind the trend toward shell molding in the nation's leading foundries is that productivity per square foot of floor space can be increased several times over other casting techniques.

Shell molding reduces sand handling costs since 90-95% less sand is used. This means less sand handling equipment; a more compact, efficient operation; greater production per man hour with unskilled help.

The latest practical information on this new foundry method is now available in a new Monsanto bulletin which explains how Resinox shell molding resin can give you metal parts with greater uniformity, fewer defects, and more accurate dimensions at lower cost. Write for it today.

Resinox: Reg. U. S. Pat. Off.

MONSANTO CHEMICAL COMPANY, Plastics Division, Room 5716, Springfield 2, Mass.

☐ Please send me your free booklet, "The Shell Molding Process."
Also, please send me information on: ☐ Monsanto resins for shell molding; ☐ Monsanto resins for core binding; ☐ Monsanto Lytron sand conditioner.

Name & Title _____

Company _____

Address _____

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MONSANTO

SERVING INDUSTRY...WHICH SERVES MANKIND

Most of the California sea lions are captured and shipped by the San Diego Zoo. Hundreds of them have been sent to circuses, zoos and theatrical training quarters all over the world. The training of sea lions calls for intensely patient work. For instance, it usually takes from six months to a year to teach them to balance a big rubber ball, their best known and favorite trick.

Performance..

The amazing tricks of the performing seal are familiar to most of us. But it's not generally known that *only* one species of seal possesses the intelligence necessary for such performance. This is the California sea lion, found off the coasts of Southern California and Lower California in Mexico.

Similarly, foundrymen seeking extraordinary performance in foundry flasks have been able to find it *only* in HINES FLASKS. Designed for efficient operation and built for rugged usage, HINES FLASKS outperform all other flasks. As a matter of fact, they'll surpass *any* type of foundry equipment in cutting costs.

So remember, it's no trick at all to get top performance in foundry flasks—just be sure to use HINES FLASKS.

Hines **FLASKS**

HINES POP-OFF FLASK

THE HINES FLASK CO.,

3431 WEST 140TH STREET, CLEVELAND 11, OHIO · TELEPHONE: ORCHARD 1-2806

Dust Control System on Rotary Breaker Screen and sand handling system in a casting plant of one of the nation's largest steel companies.

The large volumes of dust produced in the sand handling operations of this plant are not a problem. As soon as dust is formed, it is removed by the KIRK & BLUM Dust Control System.

One of the many KIRK & BLUM foundry installations, this Dust Control System meets every requirement of the American Foundrymen's Association code; heavy gauge piping has flanged joints and convenient clean-out doors.

Hundreds of plants, large and small, have found it pays in *greater operating efficiency* to have a dust or fume control system designed and installed by experts. For all three—design, fabrication and installation—call on KIRK & BLUM.

If you need a new dust control system . . . or more capacity in an existing one, contact KIRK & BLUM. They'll gladly prove the money-saving efficiency of systems by KIRK & BLUM, specialists in dust and fume control for more than 46 years. For Booklet, write The Kirk & Blum Mfg Co., 3108 Forrer St., Cincinnati 9, Ohio.

One Undivided Responsibility
DESIGN...FABRICATION...INSTALLATION
For all three—call on K&B

FOR CLEAN AIR... THE KIRK & BLUM TOOL

KIRK AND BLUM

DUST CONTROL SYSTEMS

TOUGH FOUNDRY PROBLEMS solved in a hurry!

Hundreds of foundrymen have come to rely on the Republic Pig Iron Metallurgist for quick, accurate answers to tough foundry problems.

His background, gained from years of actual foundry experience plus a thorough knowledge of all types of pig iron and their characteristics, qualifies him to help solve problems that may occur in your foundry.

The Republic Pig Iron Metallurgist is on call at any hour of the day or night for advice and help. Why not make use of his services? There's no cost or obligation.

Let us know when you would like him to call

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic PIG IRON

"CHATEAUGAY"	"REPUBLIC"	"PIONEER"
Low-Phosphorus, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

REPUBLIC STEEL

Sterling

225 Sterling Wheelbarrows used daily in this modern production foundry.

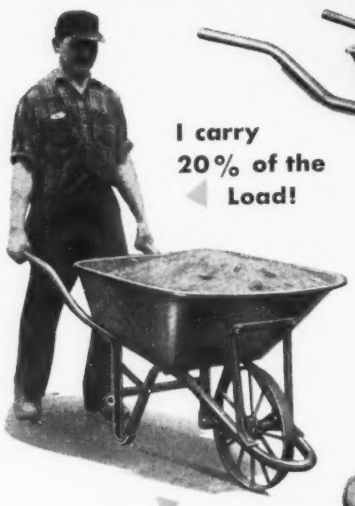
They Just Keep Rolling Along!

50 years ago, wheelbarrows were used extensively for wheeling sand, castings, scrap, etc. in American foundries. Today . . . even in this highly mechanical age . . . wheelbarrows are just as important as a means of material transport, and just as economical. They require no skilled labor and certainly present no maintenance problem. There is nothing to get out of order. They just keep rolling along.

Sterling All-Steel Wheelbarrows with Tubular Frame are tailor-made for foundries. They are ruggedly constructed to take hard everyday punishment and come back for more. Cost-saving features include: steel tray with lapped corners — all-welded construction, no rivets — heavy steel reinforcing rod rolled around top edge —V front braces and cross supports — All parts securely anchored to the sturdy, one piece steel frame. Be sure to specify STERLING on your next barrow order. IMMEDIATE DELIVERY.

Sterling

Pneumatic-tired roller bearing wheels assure smooth wheeling and easier handling.



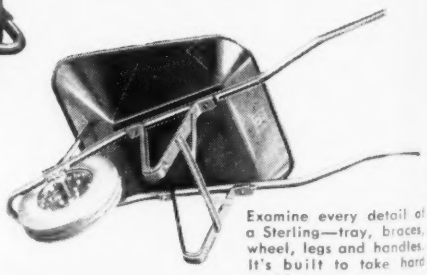
I carry 20% of the Load!

Model DF4-S for Extra Heavy Duty

A husky steel plate reinforcement supports the front, back and bottom of tray. Prevents breakage and distortion. Adds years to the life of the barrow.

I carry 80% of the Load!

Sterling's scientifically balanced construction actually takes 80% of the load off the arms and backs of the barrow men. Crews work faster, make more trips per day.



Examine every detail of a Sterling—tray, braces, wheel, legs and handles. It's built to take hard punishment.

Sterling **WHEELBARROW CO.**

Milwaukee 14, Wisconsin, U.S.A.

BRANCHES: BOSTON • BUFFALO • CHICAGO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA • ST. LOUIS

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Only DRAVO *Counterflo* Space Heaters offer you these 5 exclusive features:

Ideal for heating large open spaces in industrial, commercial and educational buildings, standard Dravo *Counterflo* Space Heaters have five exclusive advantages over other warm-air space heaters.

1 The Dravo *Counterflo* combustion method takes place in a stainless steel combustion chamber. The exhaust gases from combustion are "whirl-cooled" through two sets of economizer tubes. This four-pass heat transfer results in a minimum heating efficiency of 80%.

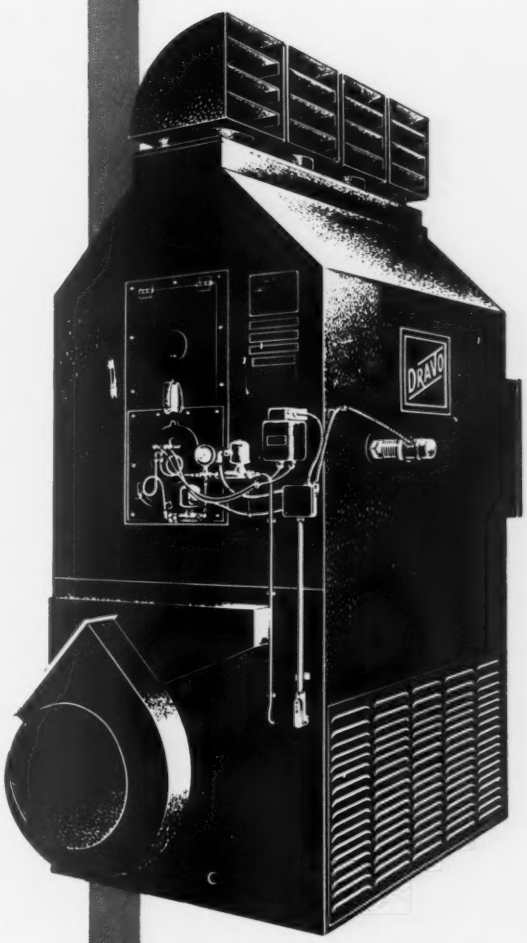
2 One rotor shaft operates all heater fans, thus co-ordinating exhaust, air-intake and heat-discharge systems.

3 Air for combustion is provided by main supply fan; volume and velocity are controlled by an adjustable damper.

4 Approved by American Gas Association and listed by Underwriters' Laboratories, Inc.; Dravo Safety Control Circuit is accepted by Factory Mutual Engineering Division.

5 Burners are designed by Dravo Engineers for top efficiency. Heaters burn gas or oil; burners are interchangeable to take advantage of fuel savings by using the most economical source of supply or in times of shortage the most available fuel.

Dravo *Counterflo* Space Heaters in addition to comfort heating are easily adapted to heat curing and process drying, tempering of replacement air and summertime ventilation. Dravo Heaters can also be tied in with air conditioning systems by making use of the same ductwork.



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Dravo Corporation, Heating Department
Dravo Building, Fifth and Liberty Avenues
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Send me information about heating for the subjects I've checked, and Dravo Heater Catalog MN 5 -910

- ☐ Space heating warehouse, garages, hangars.
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Manufactured and sold in Canada by Marine Industries, Ltd., Sorel, Quebec. Export Associates: Lynch, Wilde & Co., Washington 9, D.C.

43 Years of PROGRESS...

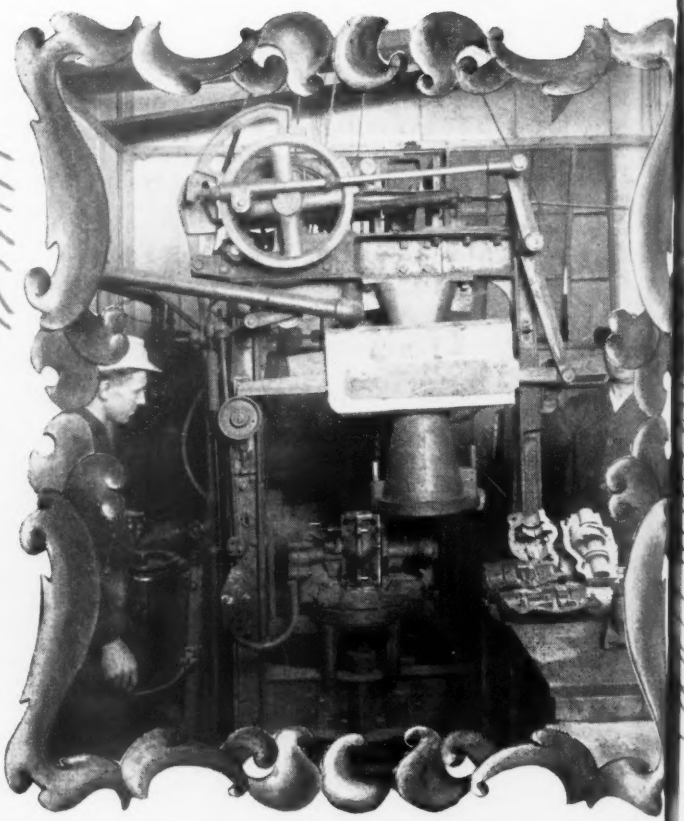
An Early Demmler Core Blower

The picture at the right, taken in 1909, shows one of the first Demmler core blowers. Some of these "old reliables" are still in use today — holding their own against modern core blowers. This machine had a line shaft driven carriage using compressed air for blow and clamp. In 1921, "old reliables" were discontinued in favor of the more modern all air operated machines.

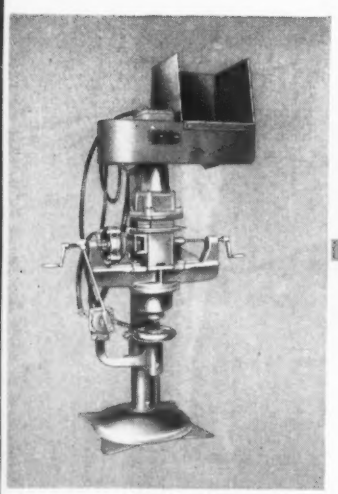
We think "old reliable" perfectly illustrates the famous Demmler quality, for only quality design and construction can make possible so many years of reliable service. Original pioneer of the core blower industry, Wm. Demmler & Bros. is still the acknowledged leader in the field.

Today, as in the "good ol' days", the name Demmler stands for quality and service. When you need information about core blowers, core boxes, vents, vented plates, etc., call on Demmler, the leader in the field. This service is yours without obligation.

DEMMLER CORE BLOWERS FOR 43 YEARS

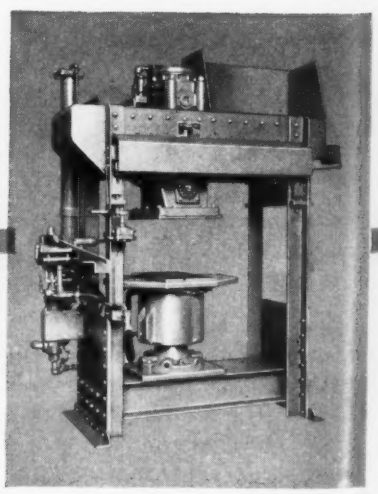


1909



MODEL NO. 55 — One hand valve operates both vertical and horizontal core box clamps. Capacity for cores up to 5 pounds. Fast economical production on short run jobs.

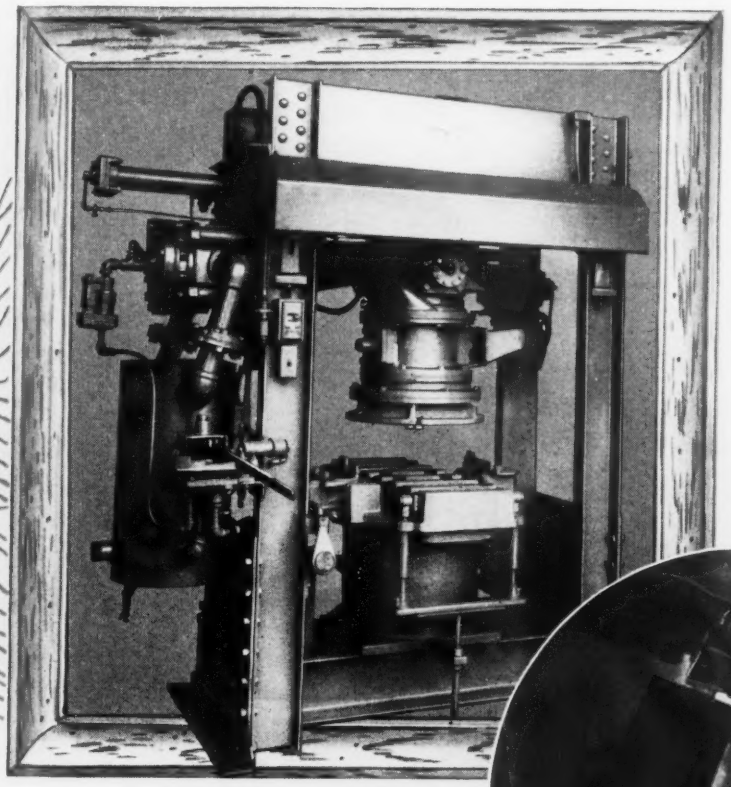
MODEL NO. 1E — Draw cylinder 11" diameter, 8" stroke. Throat opening in carriage 5" diameter. Blows cores up to 8 pounds. Designed for high production, low cost.



MODEL NO. 2E — Draw cylinder 14" diameter, 10" stroke. Throat opening in carriage 7" diameter. Capacity for cores up to 20 pounds weight. Each feature is a profit feature.

TO BRING YOU OUR

Latest Core Blower



The LATEST Demmler Core Blower

We are proud to present the 103, our latest model combining all the valuable experience we have gained in 43 years of core blower manufacturing.

The 103 is a stationary magazine type core blower, capable of blowing ANY core or molding sand. It is fast, hard blowing and extremely efficient. All air-operated, the 103 is carefully designed to minimize maintenance.

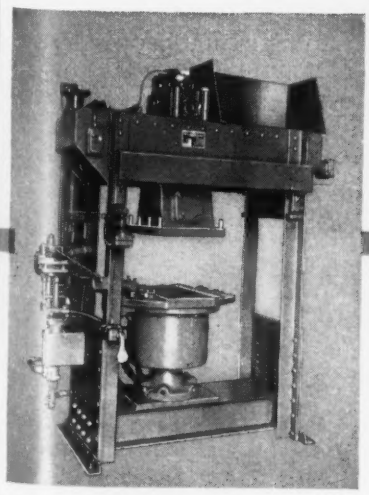
This new blower is available in two sizes. The 103 handles cores up to 50 pounds. A larger model, called the 104, is designed to handle cores up to 250 pounds. Both models have either hand or automatic operation, six second maximum cycle. Absolutely the latest and best in core blowers.

1953

Blow ANY core sand . . . no special mixing!

The amazing new Demmler Sleeve Type Magazine now makes it possible to blow ANY core sand, even that direct from the foundry sand pile, without special mixing. Because the sand is aerated in the magazine by a special Demmler process, there is no cratering or packing regardless of moisture content or green strength! Cores shown at left were blown with sand direct from the foundry's sand pile with green strength of 7 to 9 pounds. No special mixing was done, yet these cores will stand unsupported! The hand is merely balancing them.

A perfect example of an improved foundry method made possible through progressive Demmler engineering.



MODEL NO. 3E — Draw cylinder 17" diameter, 10" stroke. Throat opening in carriage 10" diameter. For blowing cores up to 35 pounds in weight. Built with Demmler quality.

WM. DEMMLER & BROS.

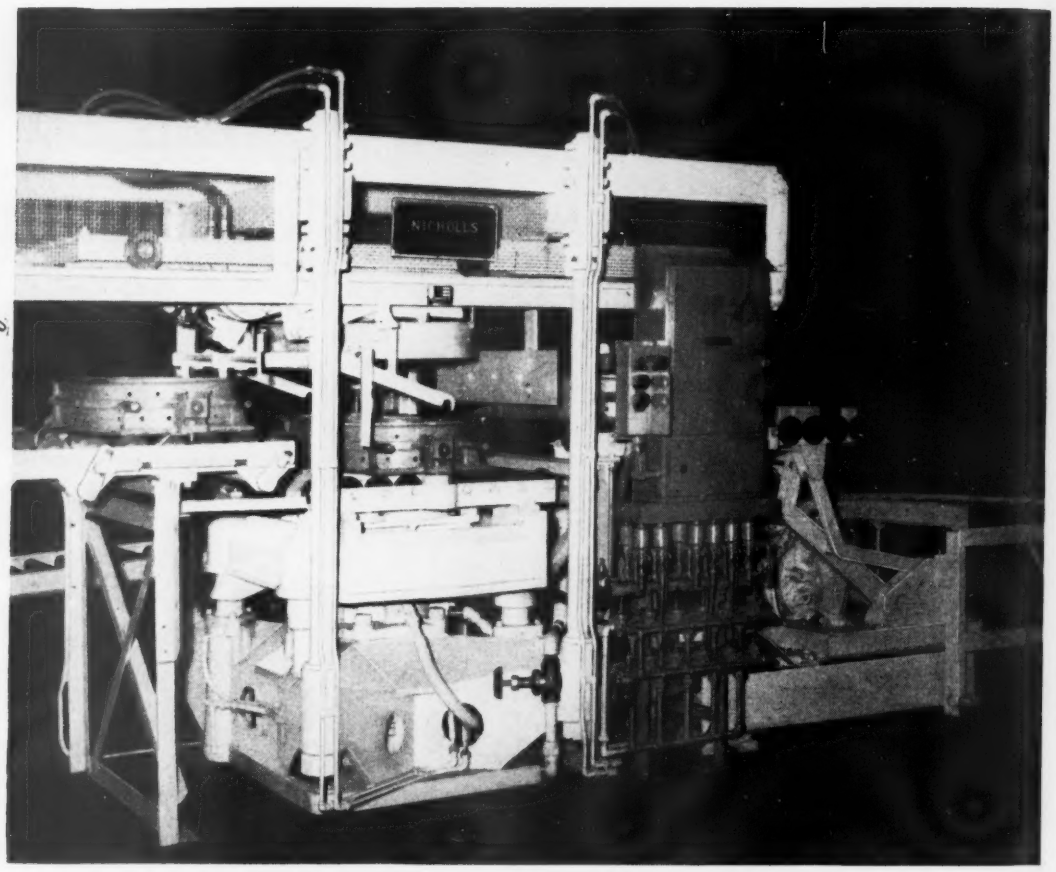
KEWANEE, ILLINOIS

NICHOLLS

New "Push-Button" Molding Machine Is Simple and Economical To Operate

No. 21 Type C.F.—Jolt, Squeeze and Pattern Draw—Automatic-Push Button Control

(Also Made in Smaller and Larger Sizes)



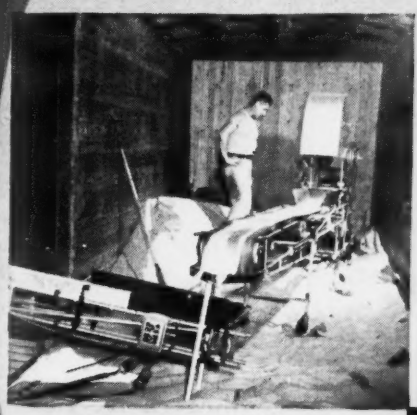
From start to finished mold, the Nicholls #21 Type CF Jolt, Squeeze and Pattern Draw Molding Machine is push-button controlled to eliminate dangerous risks, costly mistakes—to give you better molds *continuously*. Precision built for long years of service...made with all the safety devices, the hidden "quality points" that reduce maintenance costs...the know-how that almost half a century of building quality molding machines has made possible. If you're interested in better quality molds at lower cost—investigate these machines now. *For complete information, write to:*

William H. Nicholls Co., Inc., Richmond Hill 18, Long Island, N. Y.

NICHOLLS

At Last!

A PRACTICAL, EFFICIENT CAR UNLOADER FOR THE FOUNDRY



One of the biggest time savers that ever hit the industry! A practical car unloader that saves from 15 to 18 manhours per car. One or two men can now unload a carload of sand, fire clay or bentonite in 3 to 5 hours.

Two types are available—for gondola or boxcars. Both units are constructed with high tensile aircraft steel for light weight with rugged structural strength. The gondola unloader slides on rollers to reach back into each end of the car and is raised or lowered by a crank. The boxcar unloader begins at the car opening and works back to each end by means of a telescopic conveyor.

The machine soon pays for itself in labor savings and discounts earned by buying in bulk instead of packaged form.

write—

for literature, prices and specifications. Or, better still, ask to have one of our representatives stop. There's no obligation! American Silica Sand Co., 402 Central Life Bldg., Ottawa, Illinois.

SOLD TO FOUNDRIES ONLY
by
AMERICAN SILICA SAND CO.
OTTAWA, ILLINOIS

American
Silica Sand Co.
OTTAWA, ILL.

Suppliers of: Crude and dried crude silica sand • *SILTRON*® flux • Australian zircon sand • Zircon flour

SILTRON® is the trademark of Westvaco Chemical Division, Food Machinery and Chemical Corporation, for its brand of sodium sesquicarbonate.

Car Unloader Designed To Meet Foundry Needs

An automatic electrically driven car unloader, now being sold to foundries, promises to be one of the biggest time savers the industry has ever seen. It will reduce by 15 to 18 manhours the time now needed to unload cars by hand. The new machine is a combination of bucket elevators and belt conveyors applied in a manner which makes it possible for one or two men to unload an entire car in 3 to 5 hours.

Two types are available — one for boxcars and one for gondolas. The units are constructed with high tensile aircraft steel for maximum structural strength and minimum weight.

The gondola unloader is supported between two steel channels which rest on the sides of the car. It can be raised or lowered by crank so that buckets pick up sand or material being unloaded and the entire assembly moves lengthwise simply by being pushed on the rollers which "ride" on the top edge of the gondola's sides.

To unload a boxcar, the operator places the Bucket Carrier in the car opening and starts removing the material in car. As the center area is cleared, the operator attaches the Telescopic Conveyor to the Bucket Carrier. The Telescopic Conveyor extends from 8-feet to a length of 12-feet and works its way to the ends of the car.

The new car unloader will find its principal use in unloading sand, but it can also be used for fire clays and bentonite. Besides the huge savings in manhours, the new machine allows foundries to buy in bulk instead of packages, thereby creating additional savings through quantity discounts and lower prices.

Exhaustive, in-use tests have been completed and the machine has been given unqualified endorsements as a practical answer to the car unloading problem. Savings of 15 to 18 manhours per car make it evident that the machine soon pays for itself.

The new car unloaders are being sold to the foundry industry exclusively through the American Silica Sand Company, 402 Central Life Building, Ottawa, Illinois. Literature is available free of charge.

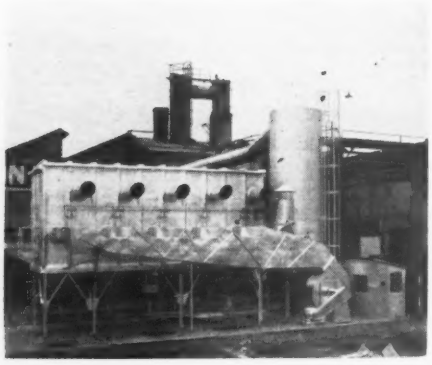
Advertisement

THROUGHOUT THE FOUNDRY

IT'S DUSTUBE®

For Highly-Efficient, Low-Cost Dust Collection

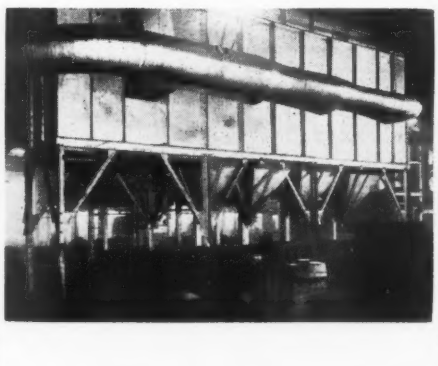
How DUSTUBE collectors eliminated a cupola fume control problem



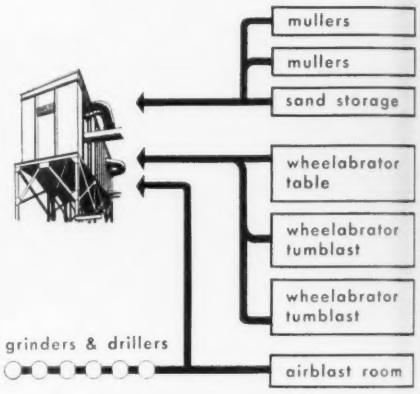
When atmospheric pollution from cupolas was prohibited in Los Angeles County, Lincoln Foundry Corp. found the least costly way to eliminate pollution from their cupola was with a Dustube Collector. The Lincoln Foundry installation is the most modern and efficient system in this strictly controlled area. It is fully automatic, positive in operation, and has received complete approval without restrictions.

How DUSTUBE collectors handle 5 big dust-creating operations in 1 foundry

More than 29,000 C.F.M. are handled in 3 Dustube Collectors at Beach Foundry, Ltd., Ottawa, Canada. Although the operations ventilated are the foundry's heavy dust creating processes—casting cleaning, grinding, drilling, sand handling and mulling—operators work in a dust free atmosphere due to the high efficiency of the Dustubes. A survey of this plant by independent engineers revealed that the dust count was exceptionally low in the casting cleaning department.



How one DUSTUBE ventilates 12 grinders, 6 tumbling mills and 3 blast cleaning machines at low cost



In the gray iron foundry of the Oliver Corp., South Bend, Indiana, one large Dustube Collector controls all the dust created in grinding, tumbling and blast cleaning. Although the Dustube is collecting an unusually heavy volume of dust, it collects it efficiently at low cost. In fact, Mr. James Reddrick, Superintendent of Maintenance, says: "The Dustube is certainly the least expensive of all dry type collectors to operate and maintain, and I can go one step further and say that the Dustubes are the most trouble-free units in our whole plant."

American

WHEELABRATOR & EQUIPMENT CORP.

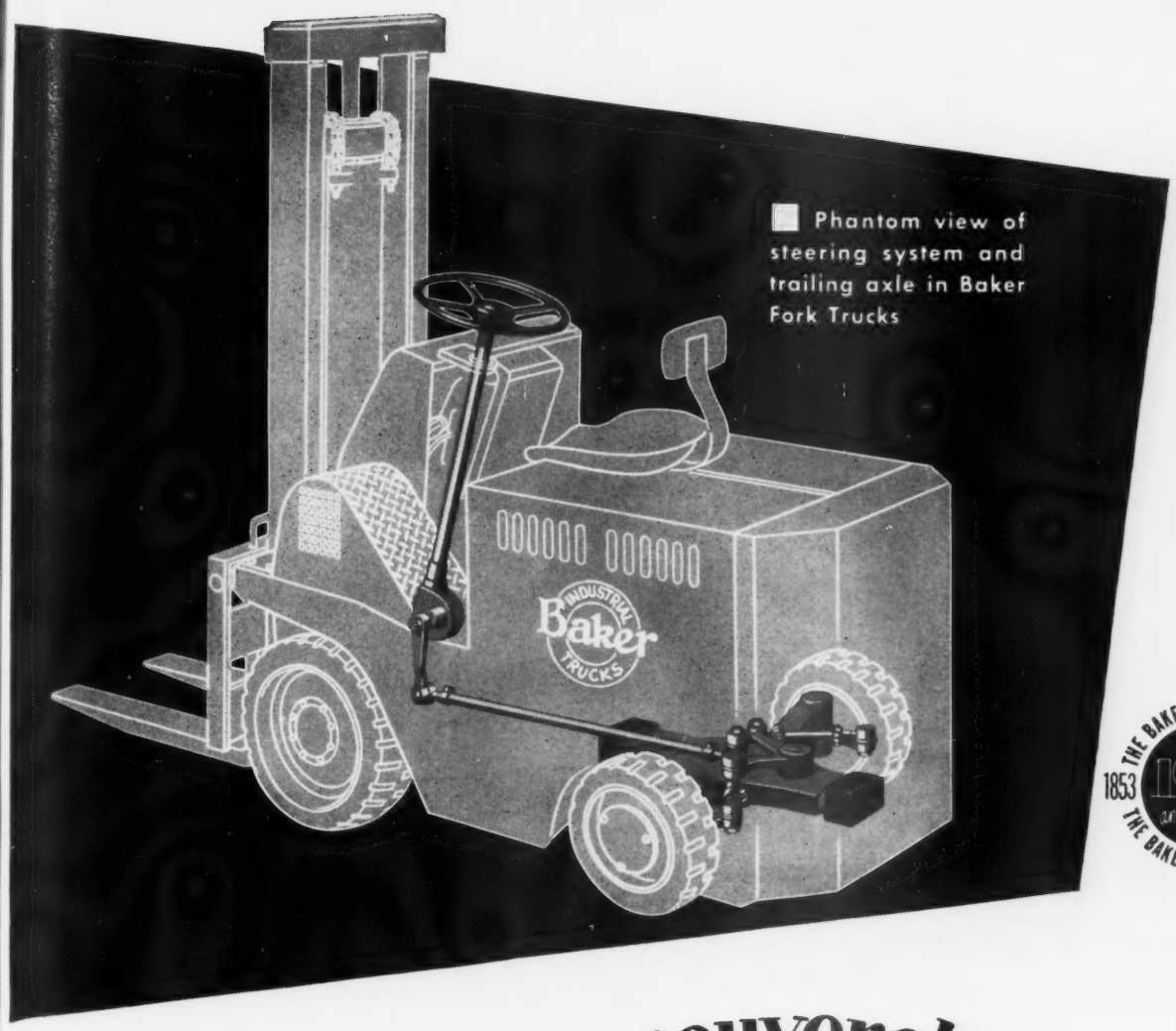
505 S. Byrkit St., Mishawaka, Ind.

dustube COLLECTORS

10 reasons

for the high operating efficiency and low operating cost of the Dustube are described in catalog 72-B.

Send for a copy today.



■ Phantom view of steering system and trailing axle in Baker Fork Trucks

THE BAKER-RAULANG CO. 1853 100th anniversary 1953 THE BAKER-RAULANG CO.

The most maneuverable fork truck

■ Maneuverability ranks high among features essential to efficient fork truck performance. Finger-tip control of steering, ability to make sharper turns and operate in narrower aisles, complete accommodation to uneven roadways, effective snubbing of road shocks – these are some of the qualities engineered into Baker fork trucks which make them the most maneuverable in their class – and less fatiguing to the operator.

Automotive type steering assembly with ball-type joints and anti-friction bearings in the steering linkage give you a truck as easy to handle as your automobile. Proper steering geometry minimizes "scrubbing" of tires. The wide-angle steering axle is mounted longitudinally in jumbo-size rubber blocks. This absorbs road shocks and provides constant, smooth traction and travel despite the most adverse floor conditions.

Write for *your copy of the "Baker Handling Library" a new portfolio of actual case histories.*

THE BAKER-RAULANG COMPANY
1223 WEST 80th STREET • CLEVELAND 2, OHIO

The Baker-Lull Corporation • Subsidiary, Minneapolis, Minn.
Material Handling and Construction Equipment

Baker
industrial trucks

5 HANDY SANDYS *save l*

The Homer Foundry Corporation, Coldwater, Michigan, a 100% jobbing operation is using five Handy Sandy Units to good advantage. The illustration above shows the five station arrangement of a single hopper Handy Sandy drag station with compound lower hopper feed type Handy Sandys on either side.

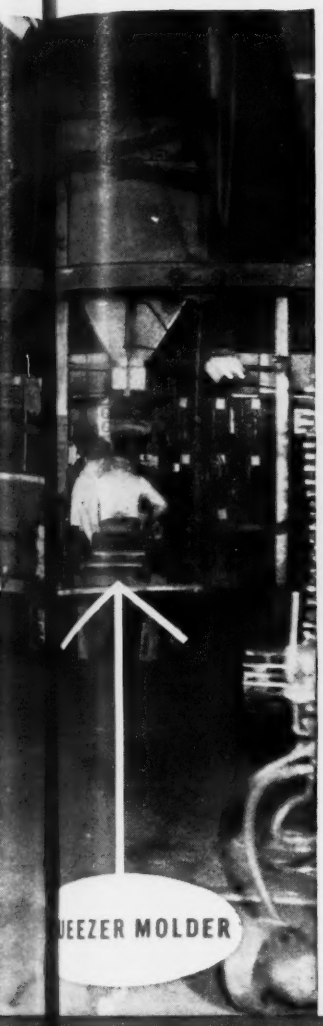
These units are grouped for the efficient handling of stack molding and squeezer molding with the three central stations available for cope and drag jobs.

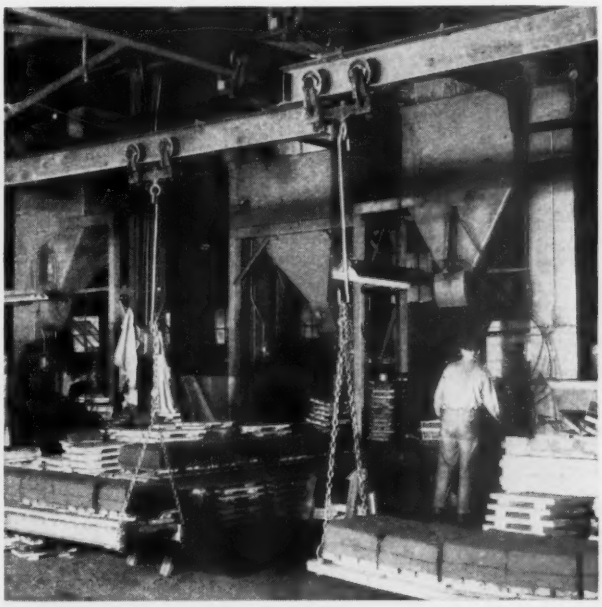
Mr. Gerald Strong, President of the Corporation states, "Labor from shoveling and hand ramming is no longer a problem, and whereas the units are fairly new with us a definite increase in production and improvement in quality is already apparent.

"Homer Foundry Corporation is also proud of the fact that management and labor worked hand in hand on the planning and installation of this semi-mechanized set-up.

"To date there has been very little maintenance on the Newaygo equipment."

Write for your copy of the Newaygo Catalog, "Planned Mechanization for Foundri





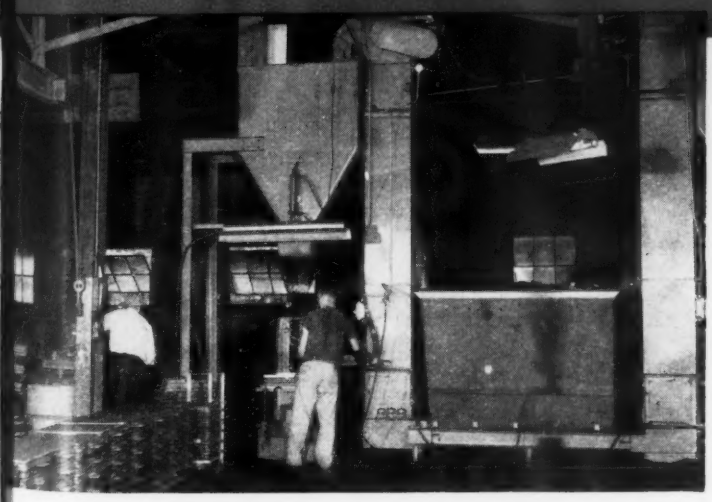
the heart of the NEWAYGO set-up

The molder at the center Handy Sandy, working on a Roll-Over unit, makes drag molds while the molders at the Handy Sandys on either side supply cope molds. Cope and drags are joined on a gravity conveyor, stripped and then set out on the pouring floor by an overhead system.

It takes only two-thirds the man hours to do the same amount of work done formerly by other methods.

When not on cope and drag work these three stations are used for other jobbing molding operations.

11 man hours daily at HOMER FOUNDRY CORP.



2,000 castings daily

The stack mold production has been set at 500 four section molds per day. This means a production of 2,000 separate castings per day which formerly took four molders and 15 other workers to handle the operation. Now with the help of the Newaygo Handy Sandy two molders and three helpers do the same amount of work, releasing 14 men for other jobs and saving about 80% in labor on the stack molding operation.

NEWAYGO | **engineering company**
NEWAYGO, MICHIGAN

Manufacturers of Neway® Mold Handling, Sand Handling and Conditioning Equipment

CONTROL
is our role!

Control! You need it to land the tricky trout . . . and you need it also to properly produce iron and steel. Keokuk Electro-Silvery *helps* you by controlling the precise percentages of silicon . . . or the exact combination of manganese, chrome or nickel to suit your melt specifications. And Keokuk controls not only quality but costs too! So write today for more information about the role played by Keokuk Electro-Silvery in charging the cupola or blocking the open hearth. You'll find it interesting . . . and profitable.

KEOKUK
ELECTRO METALS COMPANY
Keokuk, Iowa
Wenatchee Division: Wenatchee, Washington

In fishing, proper control keeps the big ones from getting away. Here, Chief Keokuk reels in tonight's fish fry while Junior stands by with a gaff and Princess Wenatchee nets a long, low whistle.

Keokuk Electro-Silvery . . . available in 60 and 30 lb. pigs and 12½ lb. piglets . . . in regular or alloy analysis. Keokuk also manufactures high silicon metal.

SALES AGENTS: MILLER AND COMPANY
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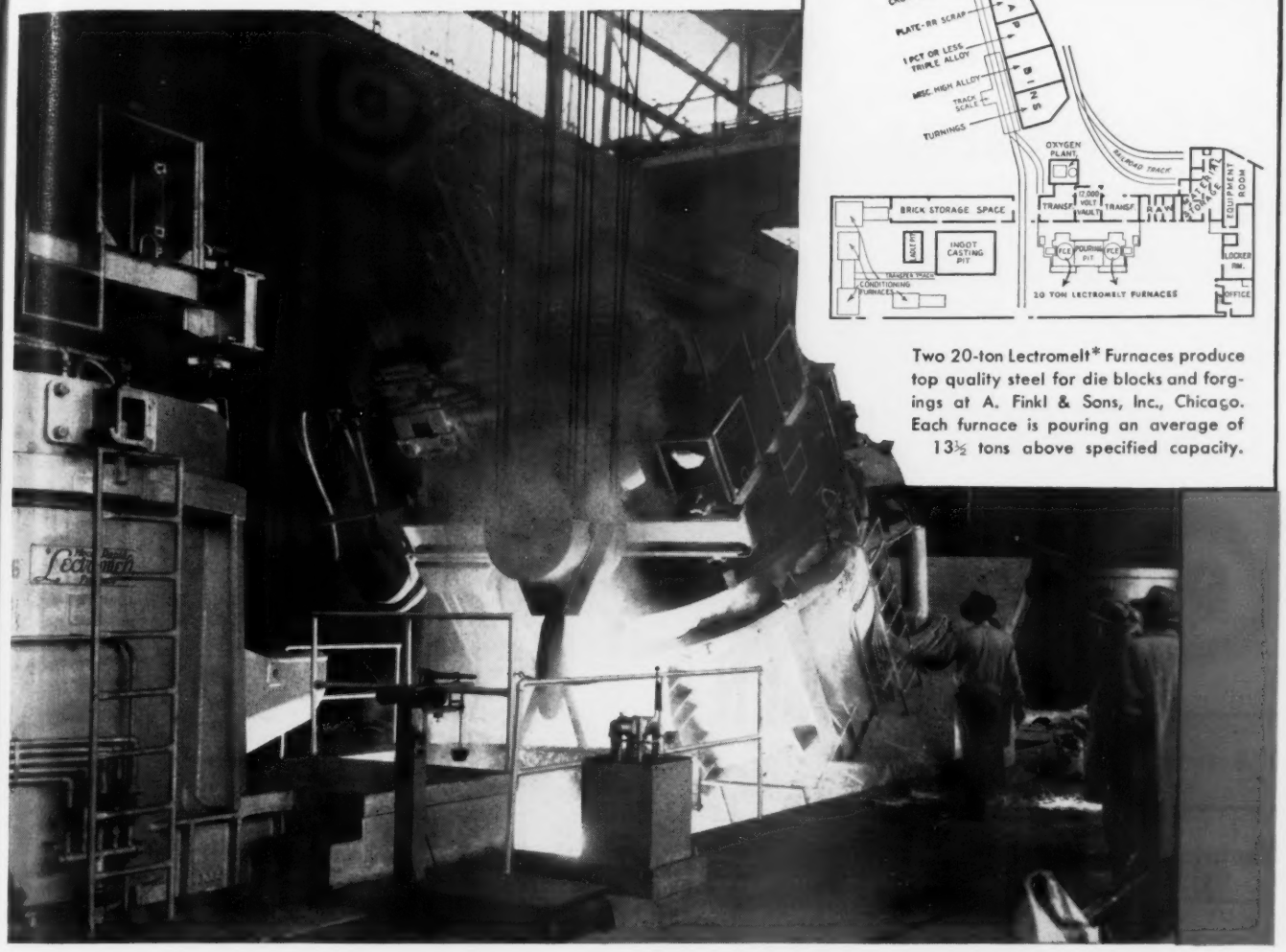
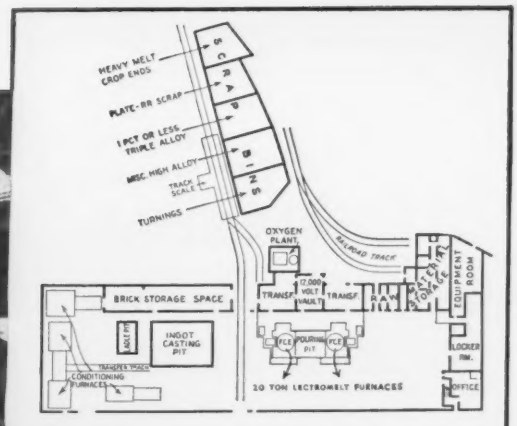
915 Olive St., St. Louis 1, Missouri
3504 Carew Tower, Cincinnati 2, Ohio





Two 20-ton Lectromelt* Furnaces produce top quality steel for die blocks and forgings at A. Finkl & Sons, Inc., Chicago. Each furnace is pouring an average of 13½ tons above specified capacity.

rated at 20 tons, Averaging 33½ tons in Finkl's new melt shop!

"They're sturdy," says Dave Hughes, Finkl's Melt Shop Superintendent, "so we felt safe in boosting the output of these two 20-ton Lectromelt Furnaces to as high as 40 tons. Our monthly average has been 33½ tons."

Finkl's Lectromelt Furnaces top-charge in 6 minutes . . . pour heats in 3½ to 4½ hours. Downtime between heats is only 25 minutes.

Your furnaces are the heart of your melting, smelting or reduction operation. They can be sturdy and dependable. Write for Bulletin No. 9 describing Lectromelt Furnace operation. The Pittsburgh Lectromelt Furnace Corporation, 314 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF.

WHEN YOU MELT... MOORE RAPID *Lectromelt*

FOR CLEAN, CONSISTENT RELEASE OF SHELL MOLDS...

Mr. G. L. Bachner shows how Dow Corning 8 Emulsion is applied in the Bachner Die-Molding Machine in use at the Powdered Metal Products Co. of Franklin Park, Illinois. The rest of the molding cycle is push-button controlled. Automatically regulated cartridge type resistance heaters in the pattern shoe and a half-cylinder infrared traveling oven are special features of this new shell molding machine. Capacity is in the range of twenty 12" x 18" shell molds per hour.

specify DOW CORNING 8 EMULSION

.... the NEW Silicone Parting Agent that makes fast, accurate low cost mold and core production practical

For consistently accurate shell mold production at low cost, try spraying your pattern plates with Dow Corning 8 Emulsion diluted with water. More effective at lower concentrations in hard or soft water than any previous parting agents, Dow Corning 8 Emulsion gives even less build-up on pattern surfaces. Dimensional accuracy is retained through longer runs and your pattern cleaning and maintenance costs are substantially reduced.

And this new silicone release agent is now available at a price 8% below that of the earlier silicone emulsions. Especially designed for the shell process, Dow Corning 8 Emulsion costs less, goes further and gives positive release from even the most complex patterns. For more information and a free trial sample, fill in and mail this coupon today.

Send for sample TODAY

DOW CORNING CORPORATION, Dept. AH-10
Midland, Mich.

Please send me ☐ Free sample of Dow Corning 8 Emulsion
☐ Data on Silicone Release Agents for the Shell Process

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Company _____

Street _____

City _____ Zone ___ State _____

DOW CORNING SILICONES

DOW CORNING CORPORATION
MIDLAND MICHIGAN

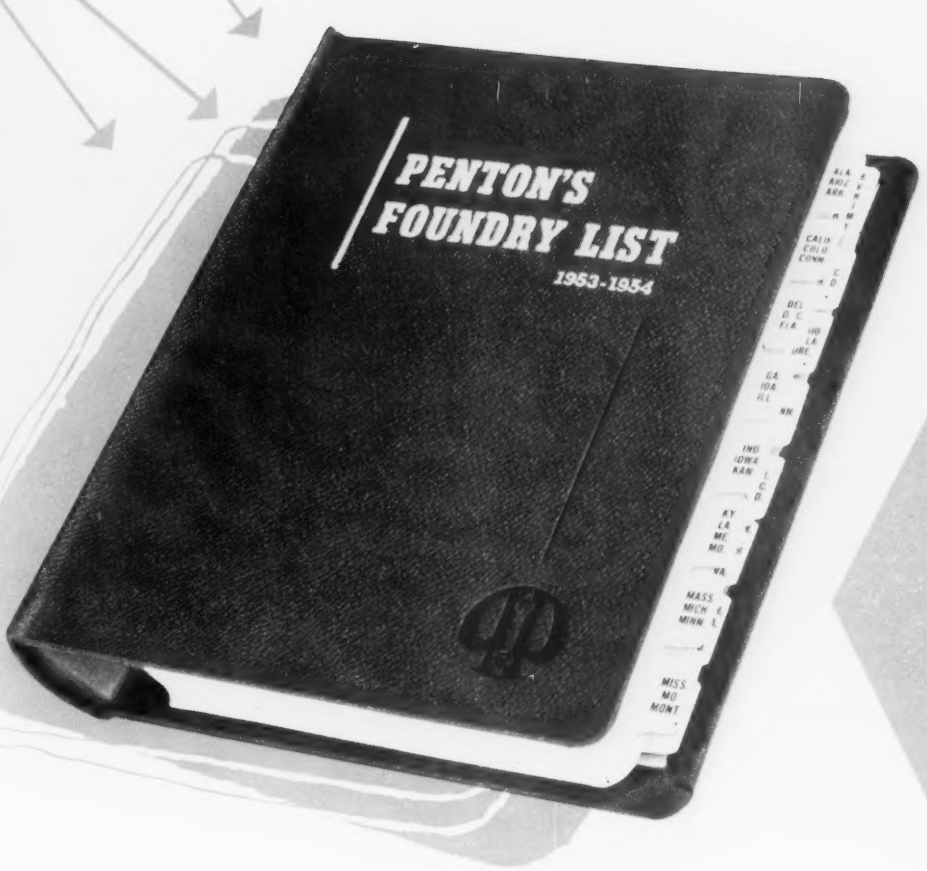
ATLANTA CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D. C. (Silver Spring, Md.)

In Canada: Fiberglas Canada Ltd., Toronto In Great Britain: Midland Silicones Ltd., London

New Foundry List

to be published

September 15, 1953



Who? Where?

Metals Melted?

Melting Equipment & Capacity?

Departments Operated?

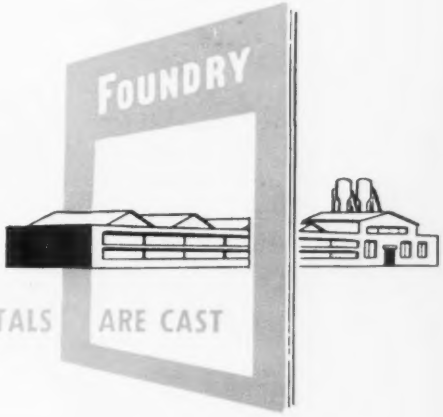
Casting Methods?

• For many years, FOUNDRY has conducted an intensive census of the foundry industry in the United States and Canada . . . every two years, basic information on all foundries is published in *Penton's Foundry List and Directory.*

The 1953-54 Edition of PFL is now available for early delivery. It gives comprehensive information on all of the 5,938 foundries in the U. S. and Canada. It tells who they are and where they are located; what metals they melt, their melting equipment capacities, and departments operated.

Well-indexed, and in loose-leaf form, PFL is useful to casting buyers and foundry suppliers. For prompt delivery, write: Book Department, FOUNDRY, 1213 West Third St., Cleveland 13, Ohio.

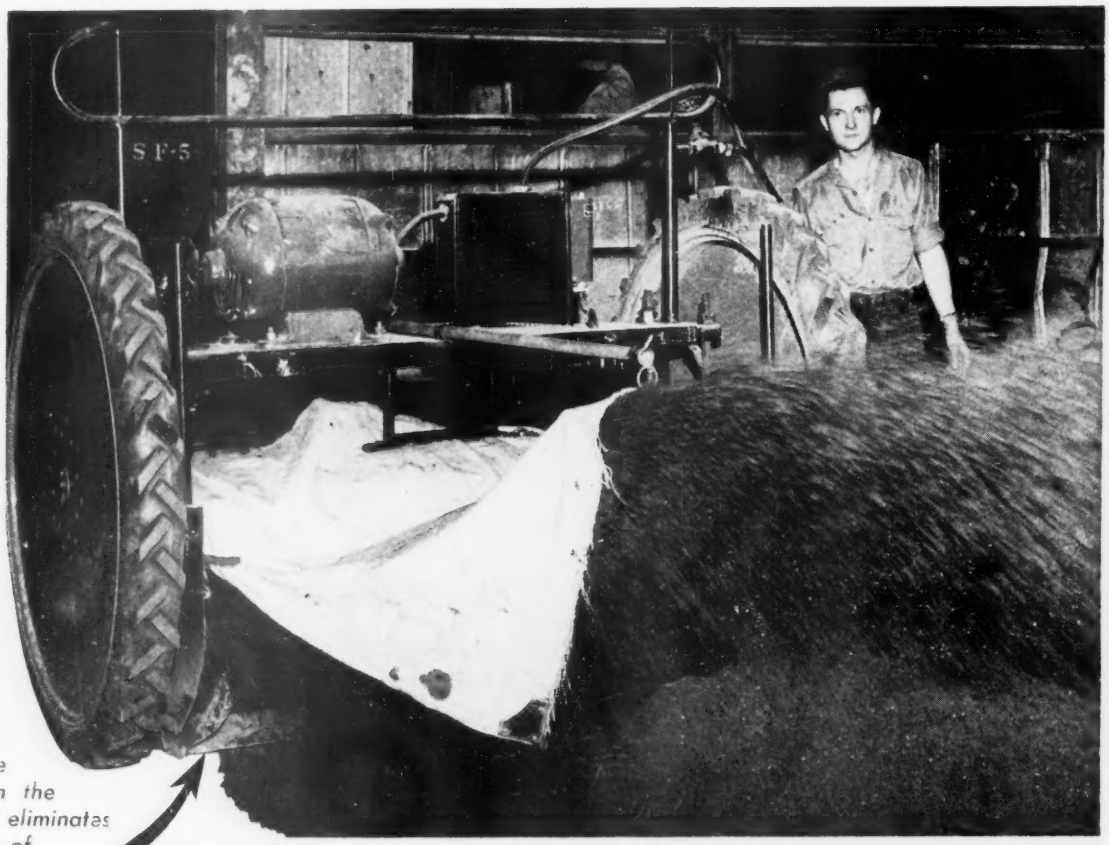
PRICE: $75 PER COPY
orders now being taken for delivery immediately on publication.



Serving Foundrymen

A PENTON PUBLICATION, PENTON BUILDING, CLEVELAND 13, OHIO

DOES BETTER CONDITIONED SAND MEAN BETTER CASTINGS TO YOU?



This drag scoops the sand from the floor and eliminates any layer of unconditioned sand

This Moulders' Friend was rolled off a truck on to the floor of a North Carolina foundry where it conditioned all of the moulding sand without any rearrangement of the heaps. The Moulders' Friend will fit your foundry too.

THE MOULDER'S FRIEND GIVES YOU THOROUGHLY CONDITIONED SAND

The thousands of flat tempered steel wires in the brush revolving at high speed pick up small particles of used sand, added bond and moisture and blend them thoroughly. This process is so thorough that either clay bond or new moulding sand is blended with the heap successfully and a minimum of moisture is required. A portable screen and water dispenser are valuable added features.

THE BRUSH DOES THE JOB

●

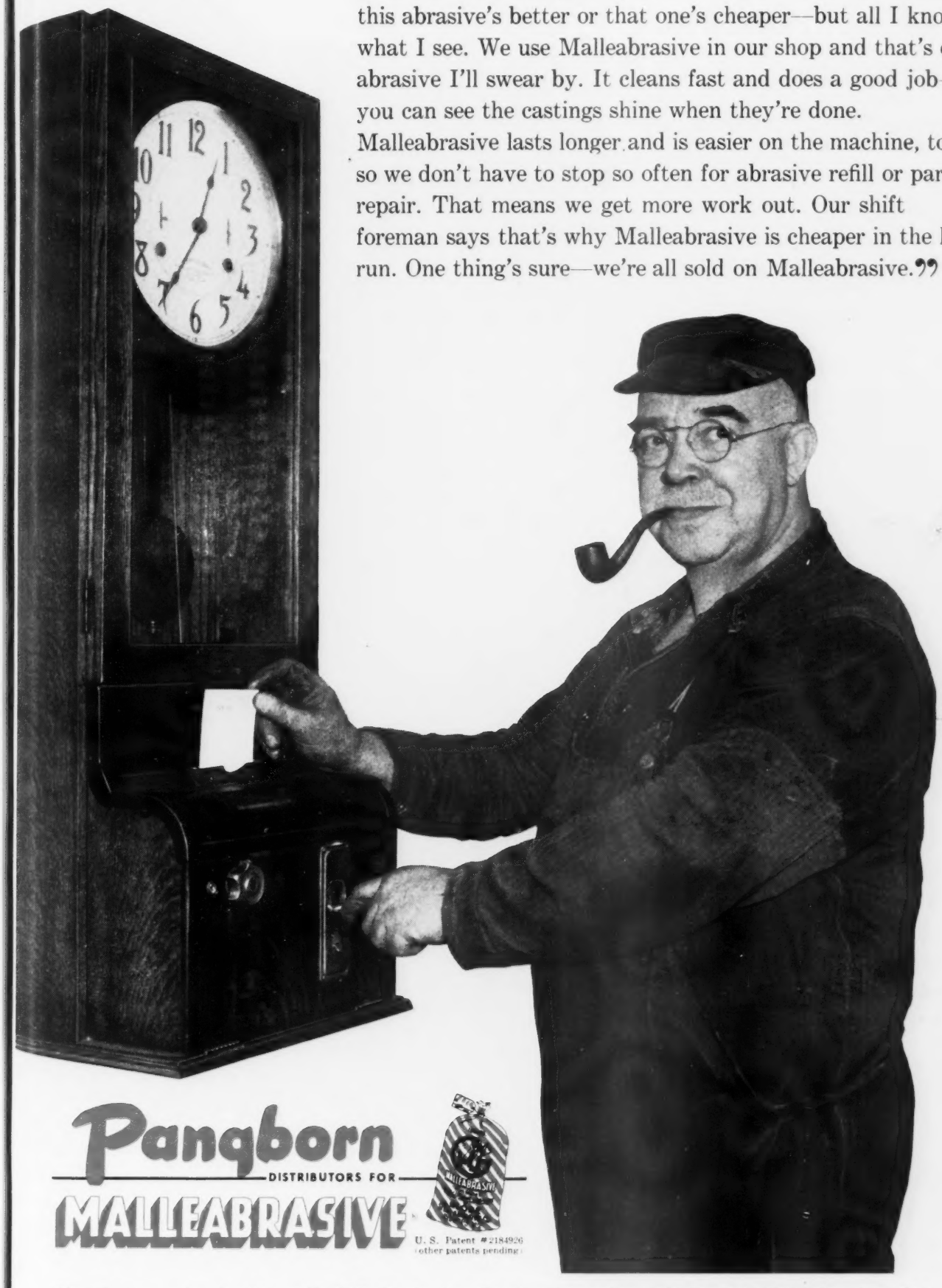
THE MOULDER'S FRIEND SAVES MONEY . . .

capacity two tons per minute—one man operation—simple construction—easy to buy and use—pays for itself with better castings and labor saved.

Investigate The Moulders' Friend today. See one in operation.

"The Moulders' Friend"
Dallas City, Illinois

"I don't know anything about fancy claims. I've heard how this abrasive's better or that one's cheaper—but all I know is what I see. We use Malleabrasive in our shop and that's one abrasive I'll swear by. It cleans fast and does a good job—you can see the castings shine when they're done. Malleabrasive lasts longer and is easier on the machine, too, so we don't have to stop so often for abrasive refill or parts repair. That means we get more work out. Our shift foreman says that's why Malleabrasive is cheaper in the long run. One thing's sure—we're all sold on Malleabrasive."



Pangborn

DISTRIBUTORS FOR

MALLEABRASIVE

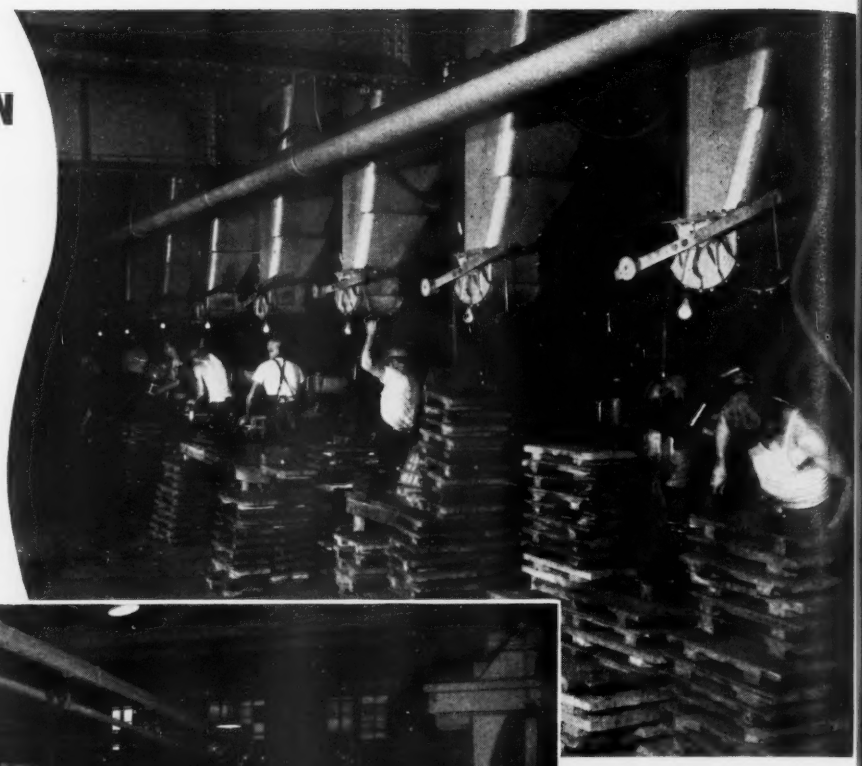
U. S. Patent #2184926
(other patents pending)

Next time you order abrasive, specify Malleabrasive from Pangborn Corporation, 1400 Pangborn Blvd., Hagerstown, Md.

Pangborn BLAST CLEANS CHEAPER with the right equipment for every job

NO MODERNIZATION WITHOUT MECHANIZATION

So Call In a JEFFREY ENGINEER



These two photos depict a Jeffrey-equipped Foundry. It is completely modernized to provide the ultimate in plant efficiency. Our Foundry Engineers are generous in their desire to help you modernize your operations.

Aerators
Bucket Elevators
Chains
Clamshell Valves
Cleanarators
Crushers

Casting Conveyors
Disintegrators
Feeders
Flask Fillers
Apron Conveyors

Paddle Mixers
Power Scoops
Mold Conveyors
Screens
Sanditioners

There must be a heap of satisfaction in having a completely-modernized Foundry . . . a smooth-running and harmonious system. Jeffrey has the equipment . . . the engineers to help you do just that . . . provide performance that enthuses the owner and the foundry superintendent alike. Give us a chance to go to work for you.

THE JEFFREY MANUFACTURING CO.

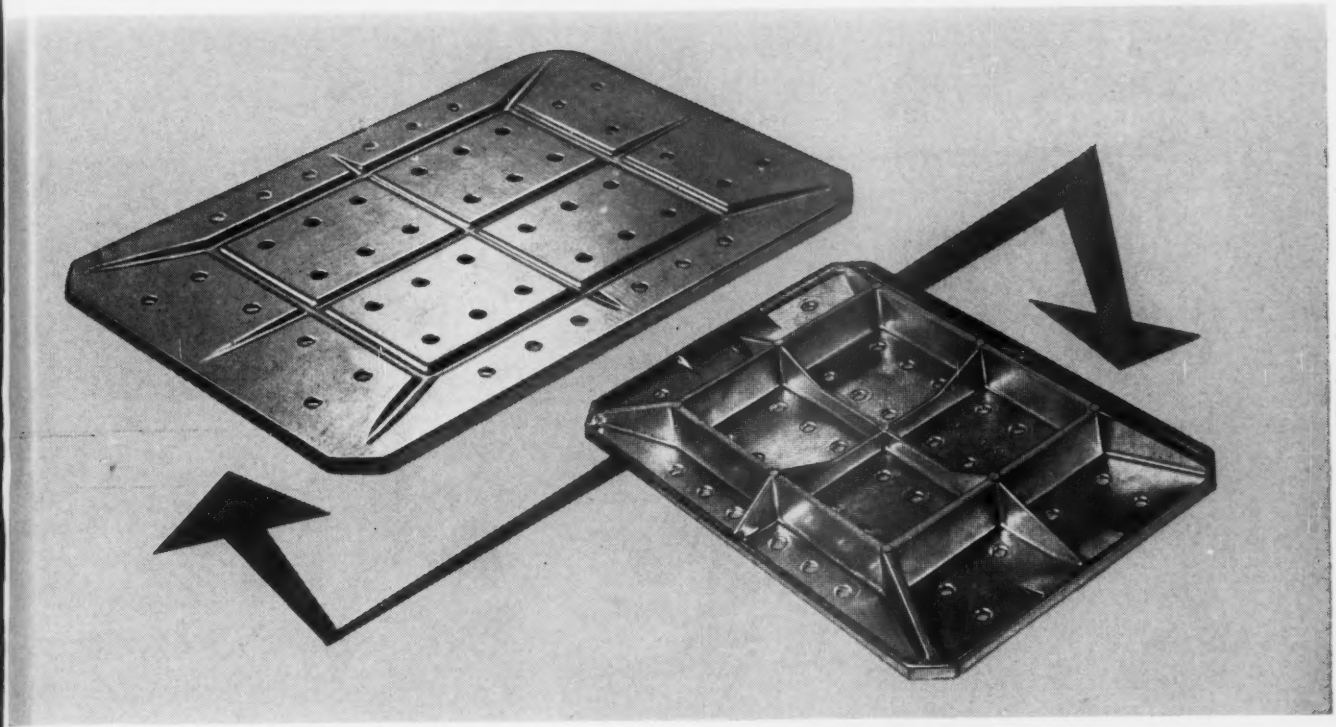
ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED
. . .IT'S A JOB FOR JEFFREY!



Look into both sides of the EDCO Dowmetal BOTTOM BOARD STORY...

-the design side...and the dollar side

Simple arithmetic is all you need to understand why the Edco Dowmetal Bottom Board story makes sense to a growing number of foundrymen. It's as simple as 1 plus 1 equals 2 . . . and 2 plus 2 equals 4.

Two main features, illustrated here, quickly tell the Edco design story . . . tell why Edco Bottom Boards produce better castings:

1. **The flask side of an Edco Bottom Board is grooved and vented to permit escape of gases and to insure mold stability.**

2. **The opposite side is braced like a bridge, and the entire board is made of light-weight magnesium—gives you strength without weight for safe, easy handling and long board life.**

That's the Edco design story.

Edco Dollar Story Makes Complete Sense, Too

When you switch to Edco Dowmetal Bottom Boards you'll find, like other foundries, that you have made a good move dollar-wise, too . . . for these reasons:

1. They pay for themselves. One foundry switched to Edco and cut its burning and breakage loss from 70% per year down to 3%. Another foundry kept a 5-year comparison record and found that under identical circumstances its wooden boards had a "casualty" record of 7500 boards lost, contrasted with a mere 12 for its Edco Dowmetal Boards. The same company found, further, that the scrap loss was 20% less with the Edco Boards.

2. You'll find that volume production of the most popular board sizes makes your original (and only) investment less than you'd normally expect.

That's the Edco dollar story.

It costs next to nothing to get the full dollars and cents story. A minute of time and a 3-cent stamp does it if you act now—but it might cost you a lot in savings lost if you put it off. Use the handy coupon.

CHRISTIANSEN CORPORATION

210 SOUTH MARION STREET
OAK PARK 1, ILLINOIS
ALUMINUM ALLOY INGOTS
MAGNESIUM ALLOY INGOTS

Without obligation, please send price schedule and list of 83 standard sizes available from stock.

Name_____

Title_____

Company_____

Address_____

City-Zone-State_____

KING SIZE

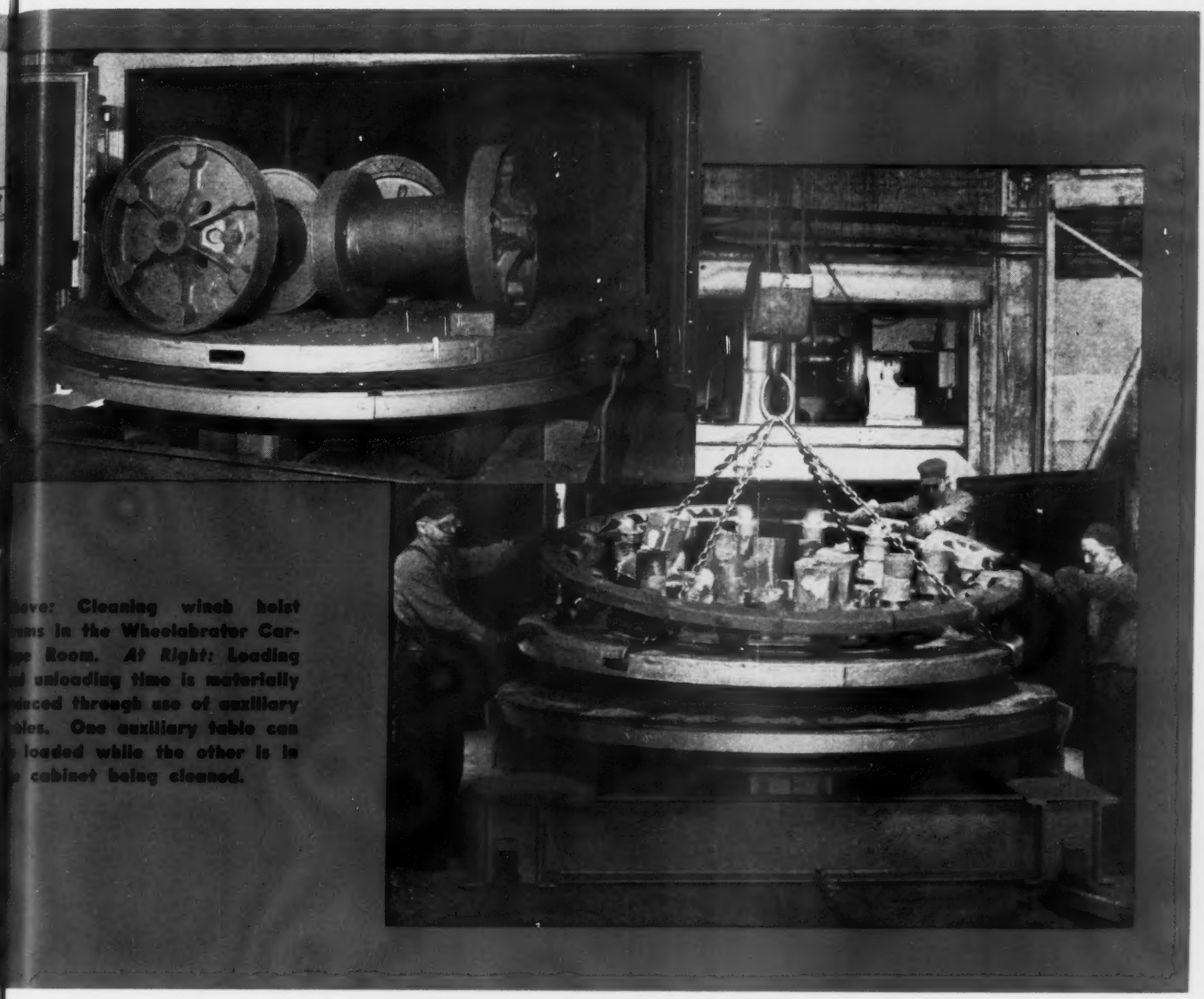
CLEANING PERFORMANCE

ON A KING SIZE JOB

WHEELABRATOR®
CAR-TYPE ROOM

cleans castings weighing from 1 to 20,000 lbs. each

A reduction of 32 man hours in direct cleaning room labor and a drastic slash in the cost of chipping and grinding were immediate results of the installation of this Wheelabrator Car Type Room at AMERICAN HOIST & DERRICK CO., St. Paul, Minnesota. Every steel and gray iron casting produced in the plant is Wheelabrated . . . large castings weigh as much as 10 tons, while the smallest weighs less than one pound. Cleaning is accomplished in a fraction of the time required by the airblasting method previously used. For example, six large cable drums that are now Wheelabrated in five minutes would have taken more than an hour to clean by airblasting.



...ove: Cleaning winch hoist ...ms in the Wheelabrator Car... ...e Room. *At Right:* Loading ...d unloading time is materially ...duced through use of auxiliary ...les. One auxiliary table can ... loaded while the other is in ... cabinet being cleaned.

WHEELABRATOR ROOMS *Speed Production, Cut Cleaning Time . . . of Large Products*

Cleaning large, heavy products has always been a problem for the average shop. Ordinarily, the conventional mill or table-type machine does not have the capacity to handle such pieces—and special equipment is sometimes unsatisfactory because of the varied nature and volume of the work to be cleaned.

In the past it was customary to hand blast such pieces in an airblast room—a slow, laborious, costly operation. Today, airless Wheelabrating has changed this picture completely, making it possible to obtain a better, more hygienic job of cleaning at higher production speeds and at greatly reduced cost.

American engineers, long-experienced in designing machines for special applications, have developed a line of Wheelabrator Rooms employing unique work-handling mechanisms to meet varied requirements. Write for Catalog 854.

HEELABRATOR ® STEEL SHOT

...duced by American, this heat-treated elec... furnace steel shot is a superior steel shot ...t gives lowest cleaning cost per ton. Send ... Bulletin 89.

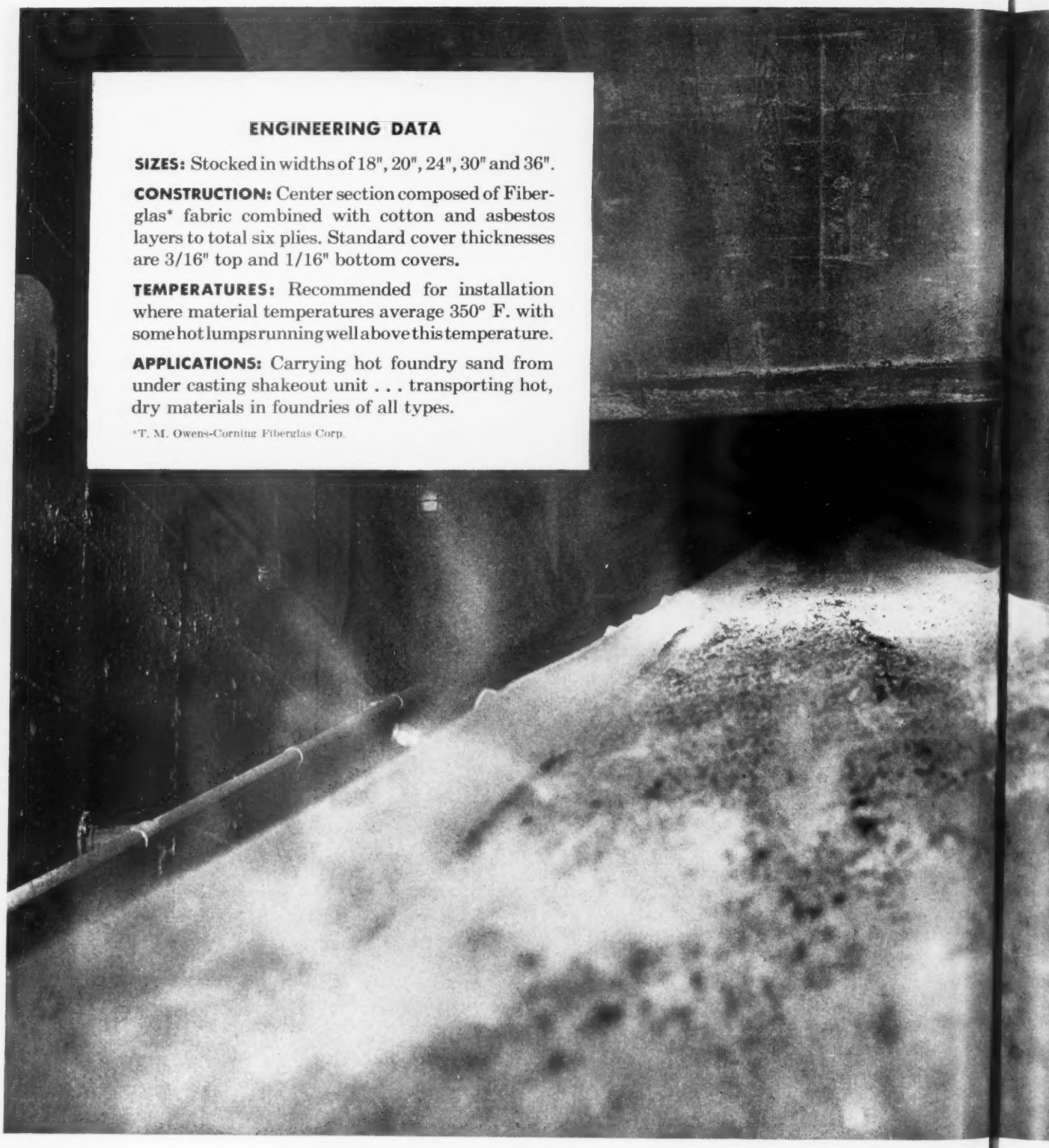
American

WHEELABRATOR & EQUIPMENT CORP.

MISHAWAKA • INDIANA

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

$3,593.81 Saving Made b



ENGINEERING DATA

SIZES: Stocked in widths of 18", 20", 24", 30" and 36".

CONSTRUCTION: Center section composed of Fiberglas* fabric combined with cotton and asbestos layers to total six plies. Standard cover thicknesses are 3/16" top and 1/16" bottom covers.

TEMPERATURES: Recommended for installation where material temperatures average 350° F. with some hot lumps running well above this temperature.

APPLICATIONS: Carrying hot foundry sand from under casting shakeout unit . . . transporting hot, dry materials in foundries of all types.

*T. M. Owens-Corning Fiberglas Corp.

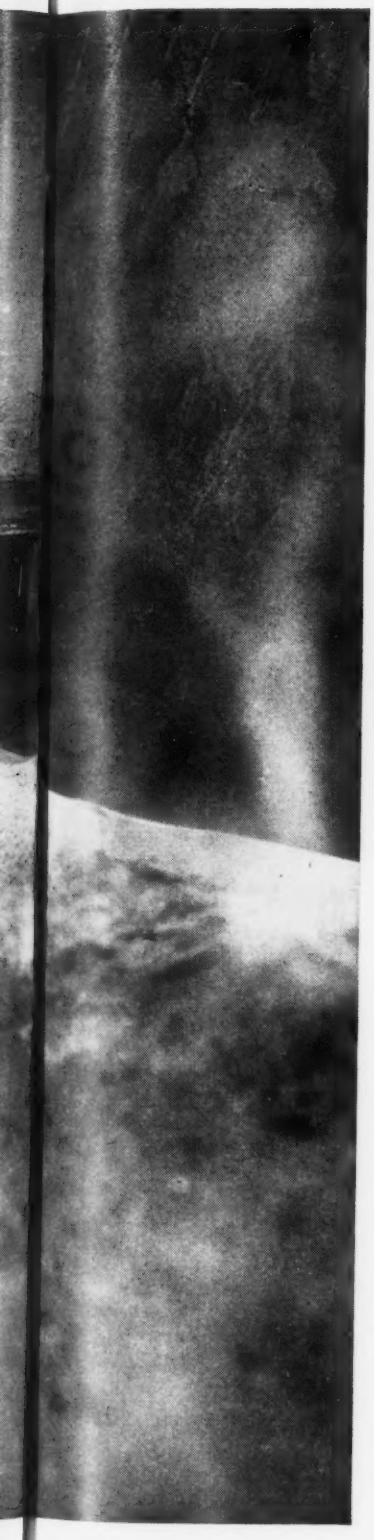
HEWITT-ROBINS INCORPORATED

HEWITT-ROBIN

EXECUTIVE OFFICES, STAMFORD, CONNECTICU

STIC DIV
GN SUBS
France • R

eby this Foundry Belt



Hewitt-Robins Fiberglas Belt Cut Belt Operating Costs 55% During 15 Months of Trouble-Free Operation

CUSTOMERS' PERFORMANCE RECORD

EQUIPMENT:

Hewitt-Robins 30" Maltese Cross® Fiberglas Conveyor Belt.

LOCATION:

Columbia Malleable Castings Division, Grinnell Company, Columbia, Pennsylvania.

MATERIAL HANDLED:

Hot foundry sand from four Mechanical Shakeout Units at temperatures well over 350° F.

PERFORMANCE:

This Maltese Cross Fiberglas Belt saved 55% in belt operating costs during a total of 4,779 production hours. The actual operating cost per hour was only $0.619 compared to $1.371 for other brands of belts previously used on the job.

RESULTS:

Eliminated down time for frequent belt changes . . . eliminated loss of metal due to belt breakage . . . saved $3,593.81 during 15 months of dependable, trouble-free service. Based upon the outstanding performance of the original belt, this plant has installed two additional Hewitt-Robins Maltese Cross Fiberglas Belts.

CHECK FOR INFORMATION ABOUT THESE JOB-TESTED PRODUCTS FOR YOUR FOUNDRY

- ☐ FOUNDRY SHAKEOUTS
- ☐ SSC UNIT

CONVEYORS:

- ☐ —Belt
- ☐ —Vibrating

BELTING:

- *☐ —Hot Materials
- *☐ —General Conveyor
- ☐ —Woven Wire

HOSE:

- *☐ —Air
- *☐ —Water
- *☐ —Steam
- *☐ —Fire
- *☐ —Twin-Weld®
- *☐ —Servall®
- *☐ —Water Suction

- ☐ BUCKET ELEVATORS
- ☐ MECHANICAL FEEDERS
- ☐ SAND SCREENS
- ☐ CAR SHAKEOUTS
- ☐ SCREEN CLOTH
- ☐ IDLERS
- ☐ BELT CLEANERS
- *☐ RUBBERLOKT® BRUSH

*For immediate information about these industrial rubber products, call your Hewitt Rubber Distributor. (See "Rubber Products," Classified Phone Book.)

Hewitt-Robins Incorporated
666 Glenbrook Road
Stamford, Connecticut

NAME

TITLE & COMPANY

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765

NCORPORATED

STIC DIVISIONS: Hewitt Rubber • Robins Conveyors • Robins Engineers • Restfoam
GN SUBSIDIARIES: Hewitt-Robins (Canada) Ltd., Montreal • Hewitt-Robins Internationale, France • Robins Conveyors (S. A.) Ltd., Johannesburg • EXPORT DEPARTMENT: New York City

IF BETTER MOLDS CAN BE MADE, YOU CAN MAKE THEM WITH

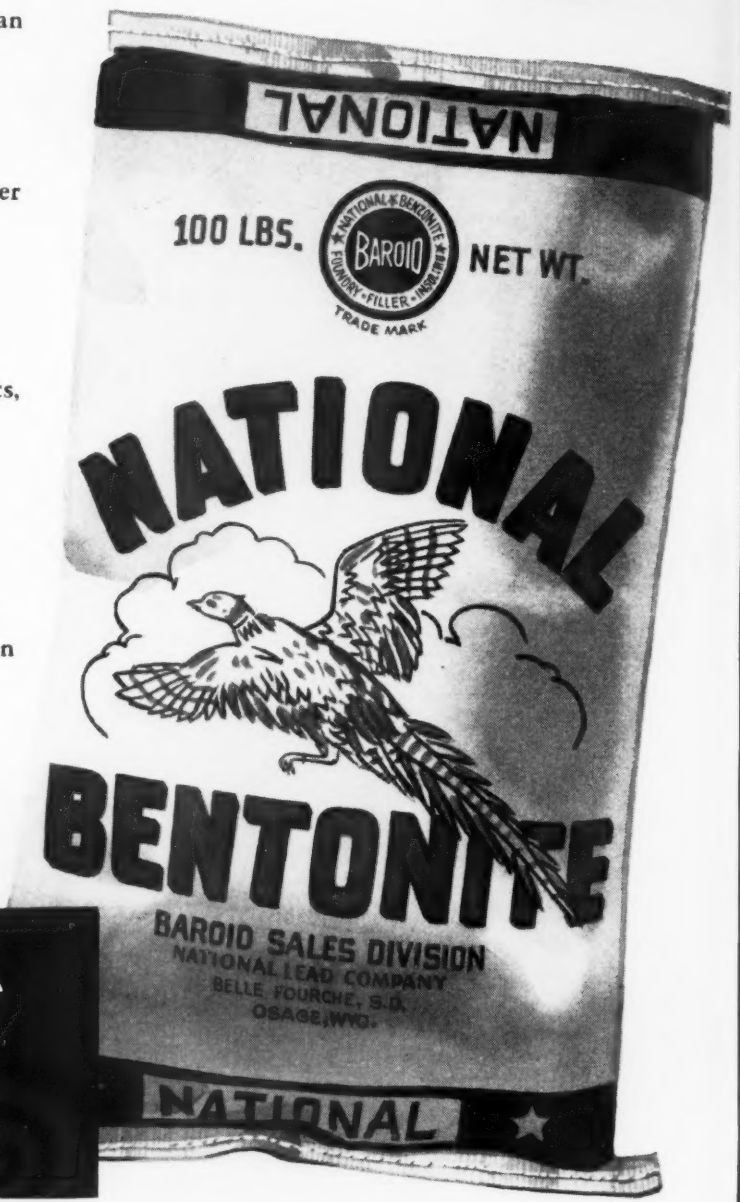
NATIONAL BENTONITE

WHY IT'S FIRST CHOICE WITH MANY GOOD FOUNDRYMEN:

Consistently uniform high quality • Good green strength • High hot strength • High tensile strength • Yields high permeability • Provides high deformation • High sintering point • Requires least water to temper correctly • Good mold durability • Close laboratory control

Among good foundrymen, you'll find many an experienced man who prefers National Bentonite for bonding because he knows he can depend on the many properties it offers to provide a superior bond . . . which means, in terms of better production, better castings which require less time in the cleaning room.

Proper moisture control being one of the most important factors in good mold characteristics, it's always best to use a bonding material that requires the least amount of water to temper correctly. Foundrymen have found that they can control their moisture content correctly with proper proportions of National Bentonite in their molding sand. That's why so many good foundrymen say, "I can rely on National Bentonite."



FIRST CHOICE WITH MANY GOOD FOUNDRYMEN FOR YEARS

Quick Service From Better Foundry Suppliers Everywhere

Baroid

Baroid Sales Division ★ National Lead Company
Bentonite Sales Office: Railway Exchange Building, Chicago 4, Illinois

Get the facts

ON ELECTRONIC CORE BAKING

FOUNDRIES using THERMEX* Electronic Core-baking Equipment report greater core room yields, resulting from high baking speed. Labor costs are cut drastically. In addition, rejects and irregularities are reduced, and dimensional stability improved.

A new THERMEX booklet will bring you up-to-date on the efficiency of modern electronic core-baking. It includes engineering economy studies made in various foundries. Comparative cost figures for old and new methods are based on actual usage, and have been approved and released *by the foundries concerned.*

Get the latest facts for yourself—send the coupon now. The Girdler Company, Thermex Division, Louisville 1, Kentucky.

*THERMEX—Trade Mark Reg. U. S. Pat. Off.

the **GIRDLER** Company
A DIVISION OF NATIONAL CYLINDER GAS COMPANY
Thermex Division

The Girdler Company
Thermex Division
224 East Broadway
Louisville 1, Kentucky

Please send me the new booklet on Electronic Core-baking

Name _____

Position _____

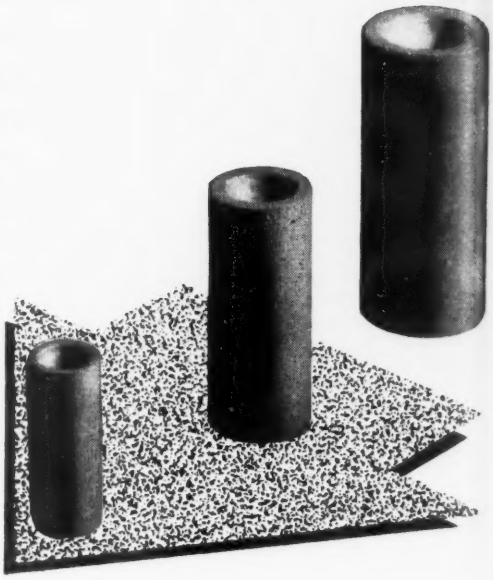
Company _____

Address _____

City _____ *State* _____

THREE REAL REASONS WHY

you should use the NORBIDE Pressure Blast Nozzle:

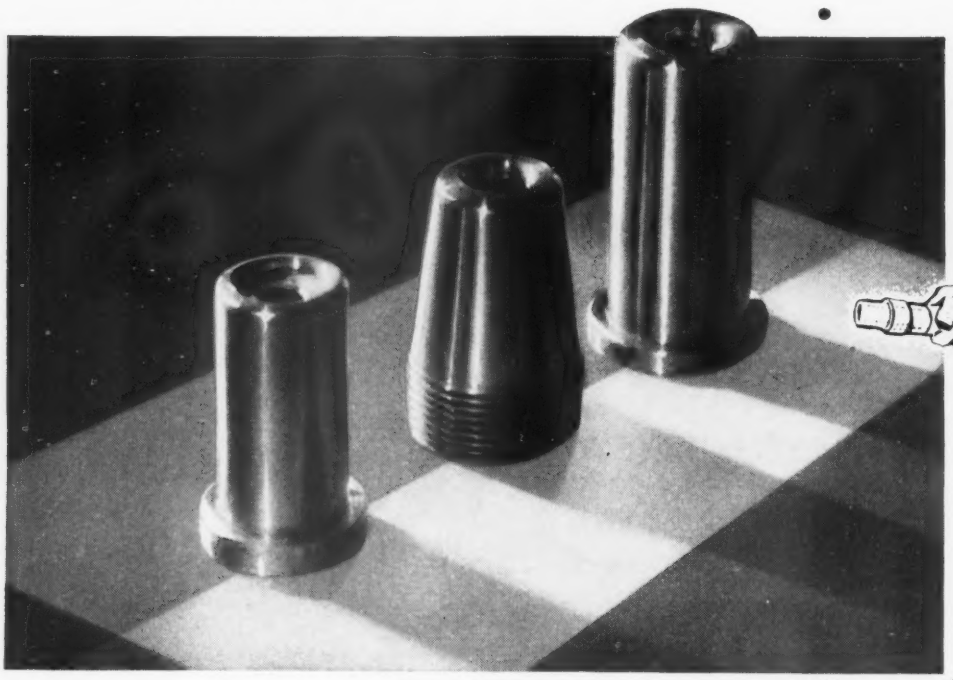


1. More service per dollar cost (750 hours silica sand — 1500 hours steel grit or shot). Norton guarantees this minimum service.

2. Decreases air consumption from 10 to 20 percent as compared with iron nozzles.

3. Maintains stream contour and abrasive velocity.

NORTON COMPANY
WORCESTER 6, MASSACHUSETTS

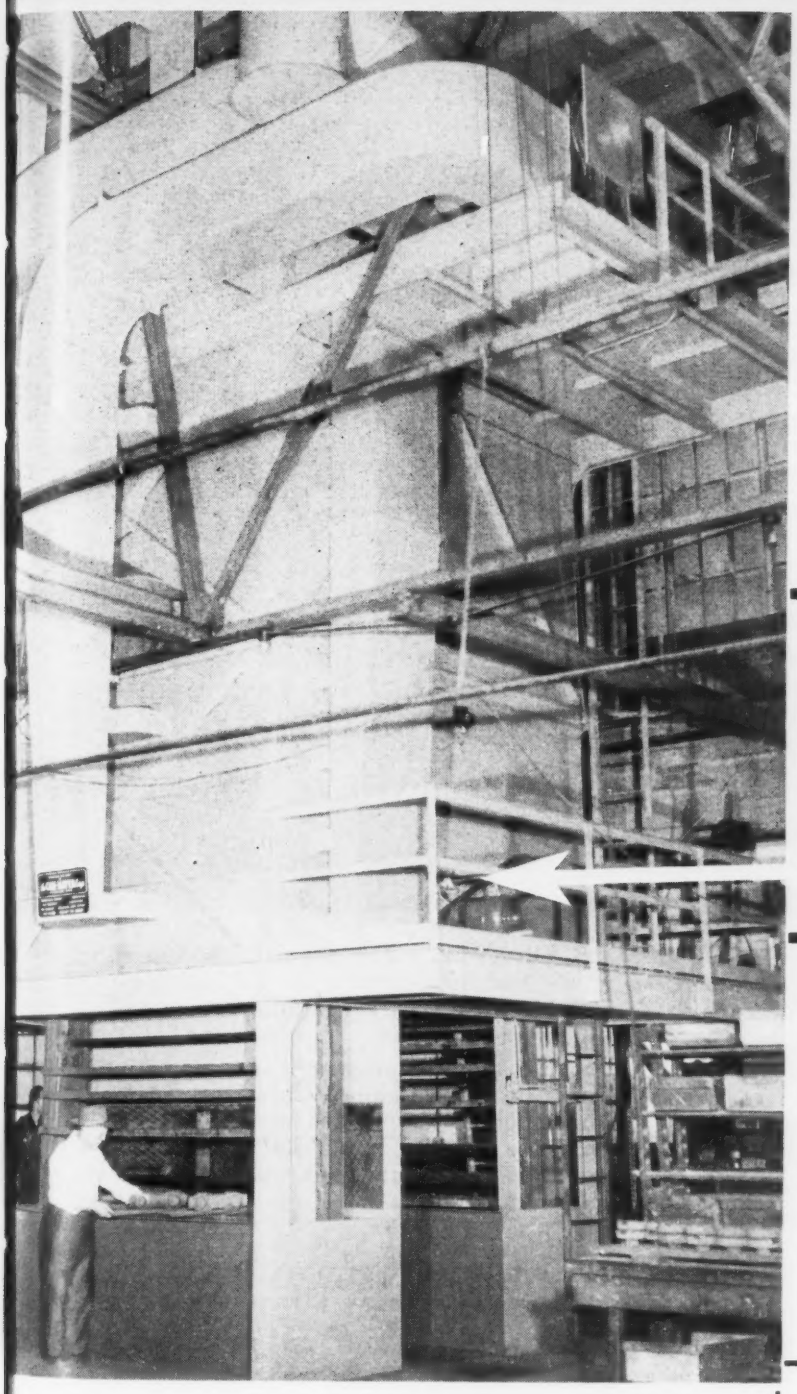


Only the diamond is harder than Norbide

NORTON

Making better products to make other products better

'ARL-MAYER'S
Important Development
in VERTICAL CORE OVENS



nt installation of Carl-Mayer Vertical Core Oven with combination gas and fired recirculating heating system, at G. & C. Foundry Co., Sandusky, Ohio

•

A few of our Vertical Oven Customers:

minum Co. of America
land Malleable Iron Co.
k Motor Div. of
eneral Motors Corp.
illac Motor Div. of
eneral Motors Corp.
tric Autolite Co.
d Motor Co.
mont Foundry Co.
G. & C. Foundry Co.
General Steel Castings Co.
Ingersoll Steel & Disc Div.
Borg-Warner Corp.
Richmond Radiator Co.
H. B. Salter Co.
Union Brass & Metal Mfg. Co.
West Michigan Steel Castings Co.
A. C. Williams Co.

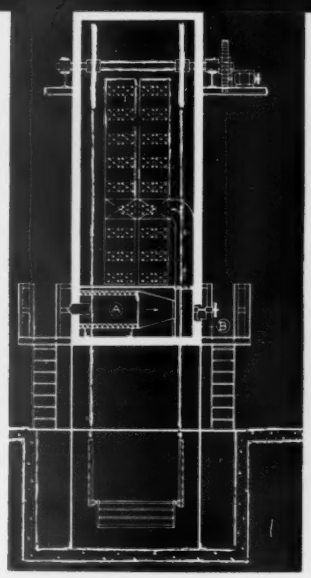


Fig. 1
NEW METHOD with heat fan inside oven. Patent No. 2628396.

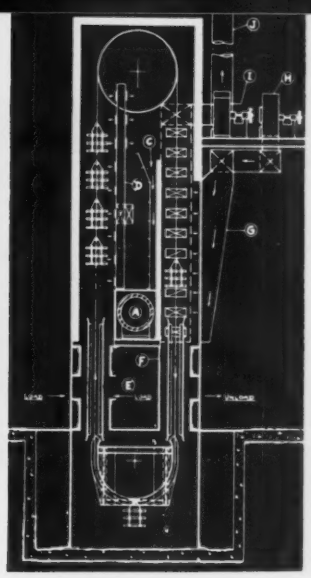


Fig. 2
Section showing conveyor travel thru pass, heating, cooling and exhaust system.

Vertical Ovens (Figs. 1 and 2) are by Carl-Mayer, using the universally adopted recirculating heating system with sealed combustion chamber located between the conveyor chains. Patent No. 2,257,180

EXCLUSIVE HEATING SYSTEM *pays off several ways!*

HEAT FAN INSIDE OF OVEN

- Saves platform space.
- Eliminates external heat duct, reducing heat losses.
- Placing heat fan *in* oven also reduces heat losses, resulting in high operating efficiency.
- By eliminating external heat duct and fan insulation, it reduces installation cost.
- There is no smoke as from external heat ducts.
- Oven appearance is greatly improved.

THIS IS BUT ONE OF THE REASONS WHY CARL - MAYER VERTICAL OVENS ARE THE CHOICE OF LEADING FOUNDRIES

Other important features contribute to faster baking, lower fuel consumption, smaller core losses, safer operation, elimination of smoke, cooled cores at unloading position and reduced labor cost.

Write for Bulletins No. 53-CM and HT-53

ALL TYPES OF CORE, MOLD OVENS

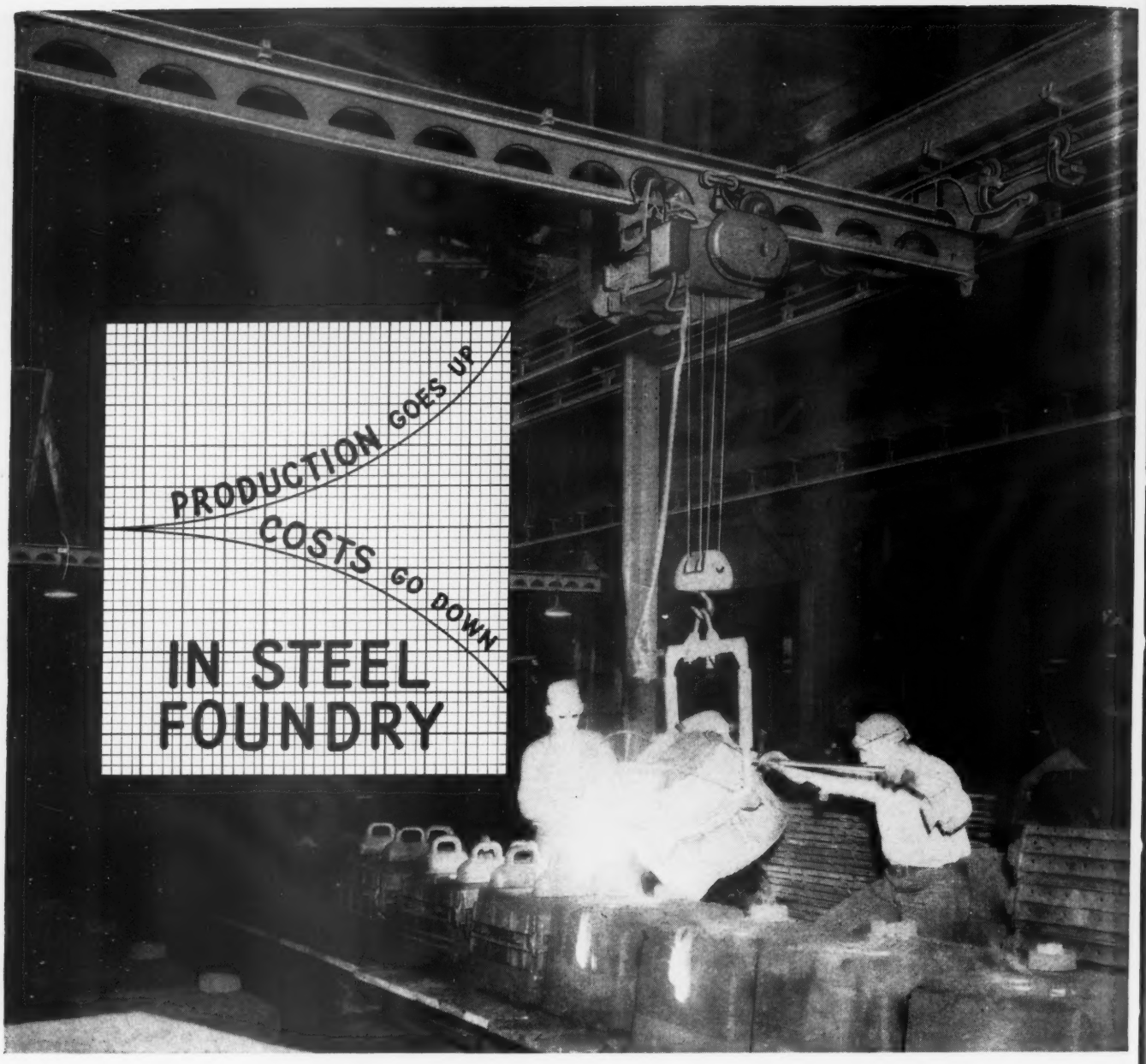
Also other types of Industrial Ovens and Furnaces

• • •

THE CARL-MAYER CORPORATION

3030 Euclid Ave., CLEVELAND, OHIO

Backed by reputation and over 30 years' Experience



When a large Steel Foundry installed an overhead Cleveland Tramrail system to serve its pouring floor two significant things happened: (a) production increased greatly, (b) costs went down.

Factors contributing to these results were:

1. Enabled use of larger pouring ladles
2. Provided efficient working routine
3. Reduced delivery time of metal to molds
4. Decreased heat loss in metal
5. Eliminated much hand lifting, lugging and hard labor
6. Minimized worker fatigue
7. Promoted safety

Because of the phenomenal success with the pouring floor installation, Cleveland Tramrail was installed in other departments with equally remarkable results. In nearly every instance the equipment paid for itself within the first six months of operation.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

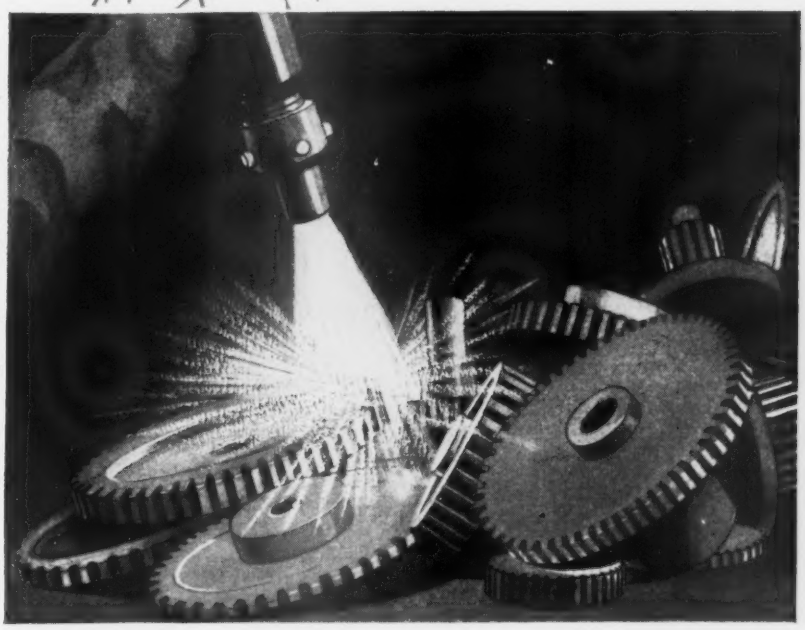
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3804 East 286th St. Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Economize with Q-ROK*

©1953 Pennsylvania Glass Sand Corp.

*CRUSHED QUARTZITE ABRASIVE
FOR QUALITY BLAST CLEANING



Offers you
5 Advantages

1. *REDUCES CLEANING COSTS*
2. *SAVES TIME, CLEANS FASTER*
3. *DOES NOT EMBED IN METAL*
4. *WEARS NOZZLES LESS*
5. *AVAILABLE IN FIVE SIZES*

Much less expensive, Q-ROK offers lowest material and labor costs per square foot of cleaning. Because of its ideal hardness factor and unique cutting ability, Q-ROK cleans faster, yet does not embed in the metal. In addition, Q-ROK definitely causes less wear on nozzles. Available in five different sizes, there is a grade of Q-ROK for every cleaning need, to satisfy every surface finish desired. Write today for free samples and prove to yourself that Q-ROK blast cleans better, faster and more economically than any other abrasive!

PENN PGS SAND

THE SURE START TO A PERFECT FINISH

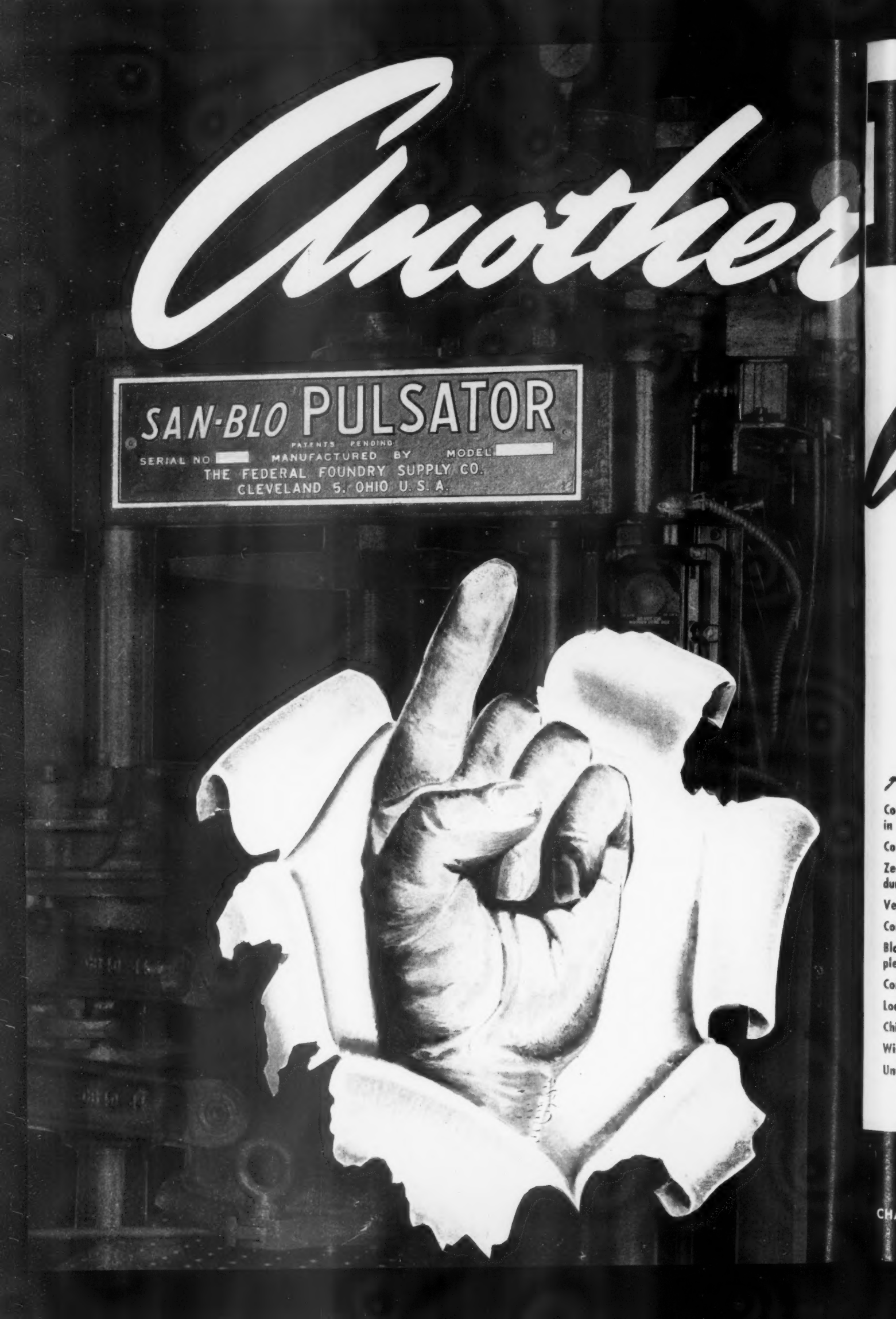
PENNSYLVANIA GLASS SAND CORP.

140 STANWIX STREET.....PITTSBURGH 22, PA.
Eastern Sales Office: Trenton Trust Bldg., Trenton, N. J.

• • • •

Nation-wide Service from Seven Plants

MOLDING SAND • CORE SAND • SILICA FLOUR • SANDBLAST SAND • SHELL-MOLDING SAND


Another
SAN-BLO PULSATOR
PATENTS PENDING
SERIAL NO [redacted] MANUFACTURED BY MODEL [redacted]
THE FEDERAL FOUNDRY SUPPLY CO.
CLEVELAND 5, OHIO U. S. A.

FIRST *for* SAN-BLO

"LOW PRESSURE PRE-FILL"*

A new core blowing advancement by means of which *low air pressure* is used to fill core boxes and *full line pressure* used to pack the sand to desired hardness.

**Now standard equipment on all SAN-BLO Pulsator Model core blowing machines, and available, as an accessory, for all standard models.*

The first SAN-BLO core blower, introduced by FEDERAL only a few years ago, revolutionized core blowing. Its radically new operating principle made it possible for foundries to blow more cores than ever before—to blow a wider variety of core sand mixtures—to blow wooden as well as metal core boxes—to produce a wide range of core sizes without time-consuming changes and adjustments—and turned a complicated operation into a simple action.

FEDERAL engineers, constantly working to improve foundry equipment, have now perfected still another means for extending the practice of core blowing—LOW PRESSURE PRE-FILL. This sensational development was possible solely because the SAN-BLO uses *"motor-driven plows" in its sand magazine to move sand over the blow holes and an "aerating air circuit" to introduce air into the lower section of the sand magazine.* These features, plus the LOW PRESSURE PRE-FILL mechanism, make it possible to *fill* core boxes with loosely packed sand, using low air pressure and then, with full line pressure, to *pack* the sand to correct hardness.

LOW PRESSURE PRE-FILL core blowing, therefore, does away with the destructive *blasting* of sand under high pressures and removes the obvious limitations imposed by the use of high pressures in blowing sand in core boxes. The many resulting advantages are listed directly to your left. And, what's very important, it makes possible the successful blowing of many complex, wooden core boxes previously considered beyond the capabilities of core blowing machines.

If you're interested in getting more core boxes off the bench and into core blowers—if you're faced with the necessity of reducing core room costs—if you've been having trouble getting experienced core room workers—then the SAN-BLO Pulsator with LOW PRESSURE PRE-FILL can be of tremendous help to you. So, why not learn more about it? Write for complete information—NOW!

Advantages

Core box wear minimized—in wood or metal boxes.

Core box repairs minimized.

Zero air pressure in core box during pre-fill.

Vent cleaning is minimized.

Core box cleaning minimized.

Blow-outs at box joints completely eliminated.

Cores will not stick to boxes.

Loose pieces will not wedge.

Chills will stay in place.

Wires will stay in place.

Unusually clean operation.

"SERVING THE FOUNDRY INDUSTRY FOR FORTY-FIVE YEARS"

FEDERAL

The **FEDERAL FOUNDRY SUPPLY** *Company*

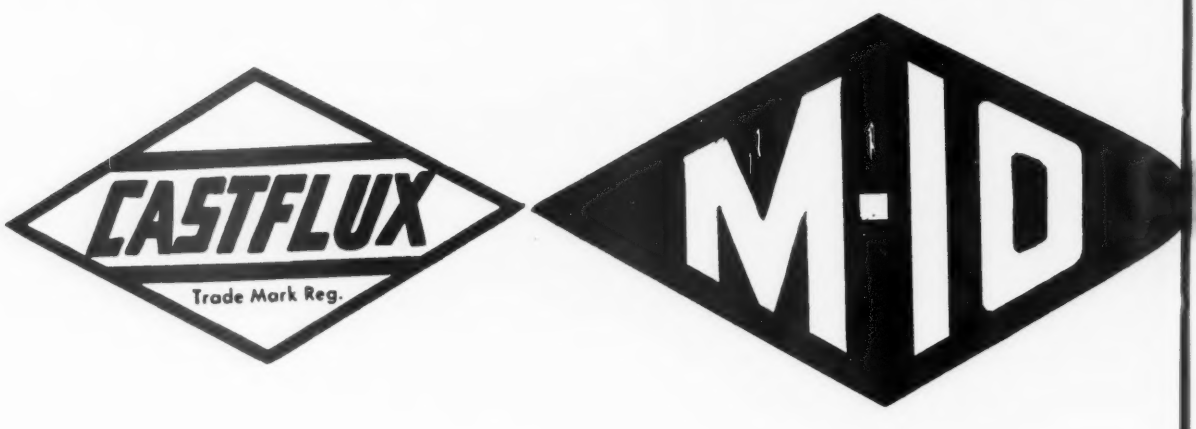
4600 EAST 71st STREET, CLEVELAND 5, OHIO

CHATTANOOGA · CHICAGO · DETROIT · LOS ANGELES · MILWAUKEE · NEW YORK

IN FRANCE—SA. PH. BONVILLAIN & E. RONCERAY, Rue Paul-Carle a Choisy-Le-Roi, Seine

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

After years of research **CASTFLUX** *announces the successful development of*



SB-10 the 'national' DUAL PURPOSE FLUX

IN THE LADLE . . . SB-10 increases fluidity materially by cleansing and purifying the metal, bringing to the surface occluded oxides, gases, slag, dirt, etc., offsetting the negative factors of inferior scrap and coke.

AS A 'HOT TOPPING' . . . SB-10 prevents oxidation by keeping molten steel down into the main body of the ingot, greatly reducing volume of piping and saving a substantial amount of metal. There is no carbon segregation or pickup.

ON BLIND AND OPEN RISERS . . . SB-10 raises the temperature of the metal to a higher degree and substantially increases and maintains the fluidity of the metal during the entire cooling-down period.

Selling Agents and Distributors of Castflux:

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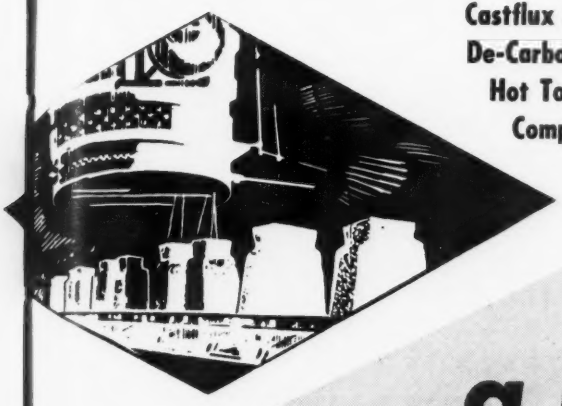
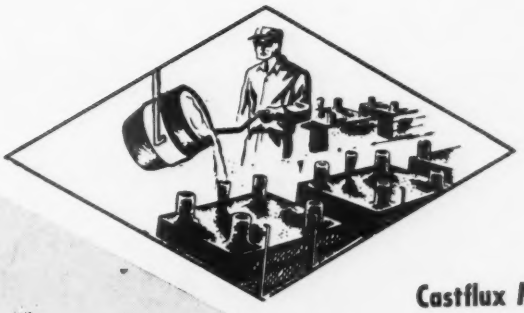
NATIONAL pigment



Castflux M-10
De-Carbonized
Hot Topping
Compound



Castflux M-10
De-Carbonized
Riser Compound

a new DE-CARBONIZED

HOT TOPPING AND RISER COMPOUND

used on
steel and malleable
castings
and ingots

Years of laboratory research and months of actual field testing have proven the superiority of CASTFLUX M-10 over most hot topping or riser compounds on the market today. The less than 3% carbon content of M-10 once and for all precludes any carbon pickup, segregation or contamination in any steel or steel alloys, and permits the control of carbon content in your metal without variation.

Depending on the size of the head, various tests have shown as much as 25% reduction in the depth of the piping, resulting in more solid metal in your ingot.

CASTFLUX M-10 will feed more riser metal into the main body of the casting and materially reduce any undesirable shrink, both internal and over-all.

As a ladle covering, CASTFLUX M-10 retains the pouring temperatures of the metal for a far longer period, thus permitting short pouring, and substantial saving of remelt metal.

DE-CARBONIZED CASTFLUX M-10 with all the improvements and the many advantages is still only priced the same as CASTFLUX SB-10.

That DE-CARBONIZED CASTFLUX M-10 will increase the yield and improve production at considerable savings has been conclusively proven. You, too, will benefit by a test-trial.

unconditionally GUARANTEED

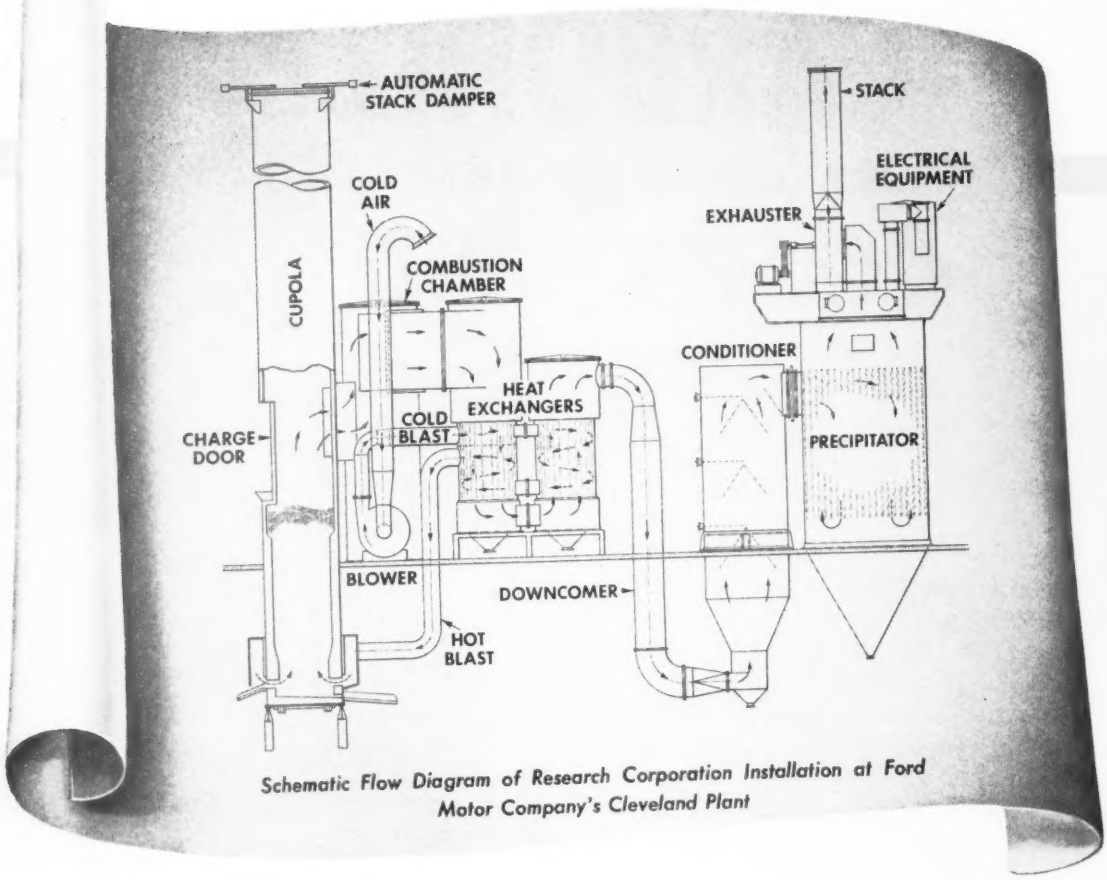
Unless Castflux meets with your full approval, material can be returned at no expense within 30 days.

* less than 3% carbon content

C(IC . ORTHODOX ST. AT DELAWARE RIVER, PHILA. 37, PA.

NEW CUPOLA PRECIPITATORS

assure clean stacks at Ford



Schematic Flow Diagram of Research Corporation Installation at Ford Motor Company's Cleveland Plant

The schematic diagram above shows how one of the five Cottrell Precipitators removes suspended dust from the gases originating in ten iron ore cupolas. These Research Corporation units consist of (A) a water spray conditioning and cooling chamber, (B) a vertical flow precipitator with the patented MI Rapper, which eliminates rapping puffs, and (C) an induced draft fan.

If your cupola stack gases are a problem, contact your Research Corporation Engineer. He will give you the benefit of development and pilot plant experience as well as recommendations based on results of commercial installations.

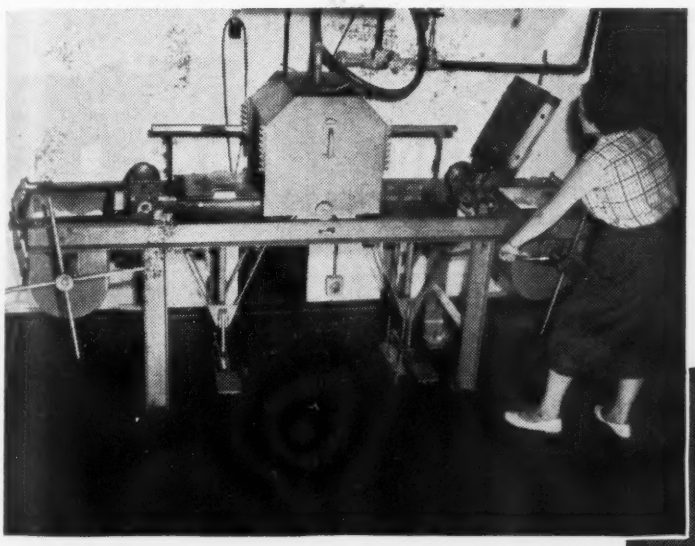
RESEARCH CORPORATION

405 Lexington Avenue, New York 17, N. Y.
Bound Brook, N. J. • Grant Building, Pittsburgh 19, Pa.
122 South Michigan Avenue, Chicago 3, Illinois

RC 142

SEE... THE NEW TYLER SHELL MOLDING MACHINES

IN ACTUAL OPERATION . . .
Electric or GAS HEATED OVENS and PATTERN PLATES!



You can now heat your pattern plates with gas. The gas heating unit stays with the pattern plate at all times during the operation and holds plate at even temperature. Through the use of gas heating pattern plates, it is not necessary to strip heat or wire each plate, remove plate and insert next plate and continue with production. Eliminates wiring and maintenance.

See these machines in operation in our Sales Display Office.

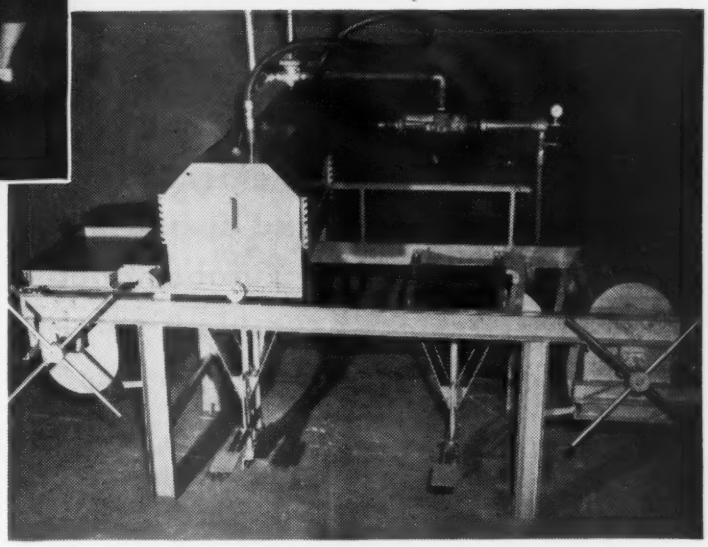


Photo above shows new gas heated pattern plate.
This machine 13″ x 12″ is priced at $1,250.00, plus heating units.

The machine pictured at the right, size 13″ x 24″ is priced at $1,750.00 plus heating units. All prices are F.O.B. St. Louis, Mo. One week delivery.

We also have fully automatic machines making castings from pattern plates sizes 24″ x 26″. The production rate of Tyler Molding Machine is one shell every 45 seconds.

TYLER METAL Products Company

METAL STAMPINGS — DESIGNERS & BUILDERS
SPECIAL MACHINERY — TOOLS — DIES — JIGS
FIXTURES — SHELL MOLDING EQUIPMENT

10TH & MULLANPHY STREETS
ST. LOUIS 6, MO.

TYLER METAL PRODUCTS CO.—
10th & Mullanphy, St. Louis, Mo.

I AM INTERESTED

☐ In seeing machine in operation

Date ..... Time .....

☐ Would like someone to call on our company with more information

Date ..... Time .....

Company Name .....

Address .....

Signed ..... Title .....

THEY'RE PROVEN . . . . . ENGINEERED!

MORE and MORE FOUNDRIES "See the Light"

112 AAF FURNACE HOODS 1058 TONS/MELT — **1953**

74 AAF FURNACE HOODS 739 TONS/MELT — **1950**

29 AAF FURNACE HOODS 245 TONS/MELT — **1947**

7 AAF FURNACE HOODS 122 TONS/MELT — **1944**

Electric melting furnaces emerge from haze of smoke and dust with installation of AAF Furnace Hood and ROTO-CLONE combination.

There are 112 electric furnaces operating in foundries today where smoke, dust and fumes are just a memory. Visibility is unlimited the year 'round and working conditions are of the best. The secret of this foundry reformation—the AAF Furnace Hood and Type N ROTO-CLONE*.

AAF Furnace Hoods have been designed for all makes of electric melting furnaces (top and side discharge) from 1/2- to 75-ton capacity. The circular hood is attached to the furnace roof ring so as to permit full operation without hindrance. Metallic fumes and dust are removed at their source, permitting complete foundry ventilation with minimum movement of air and use of power.

Experience has proven the AAF Type N as the ideal exhauster-collector for this service. Since it is a wet-type collector, it cools and contracts the hot gases during the boil and refining period—maintains a uniform inflow of air during the complete furnace cycle and provides high efficiency collection of the fine dust particles.

Act now before another winter season finds you confining this smoke and dust behind closed doors and windows. Let this proven AAF combination make your electric melting furnace the brightest, cleanest operation in your foundry. A call to your local AAF representative will start the ball rolling—fast.

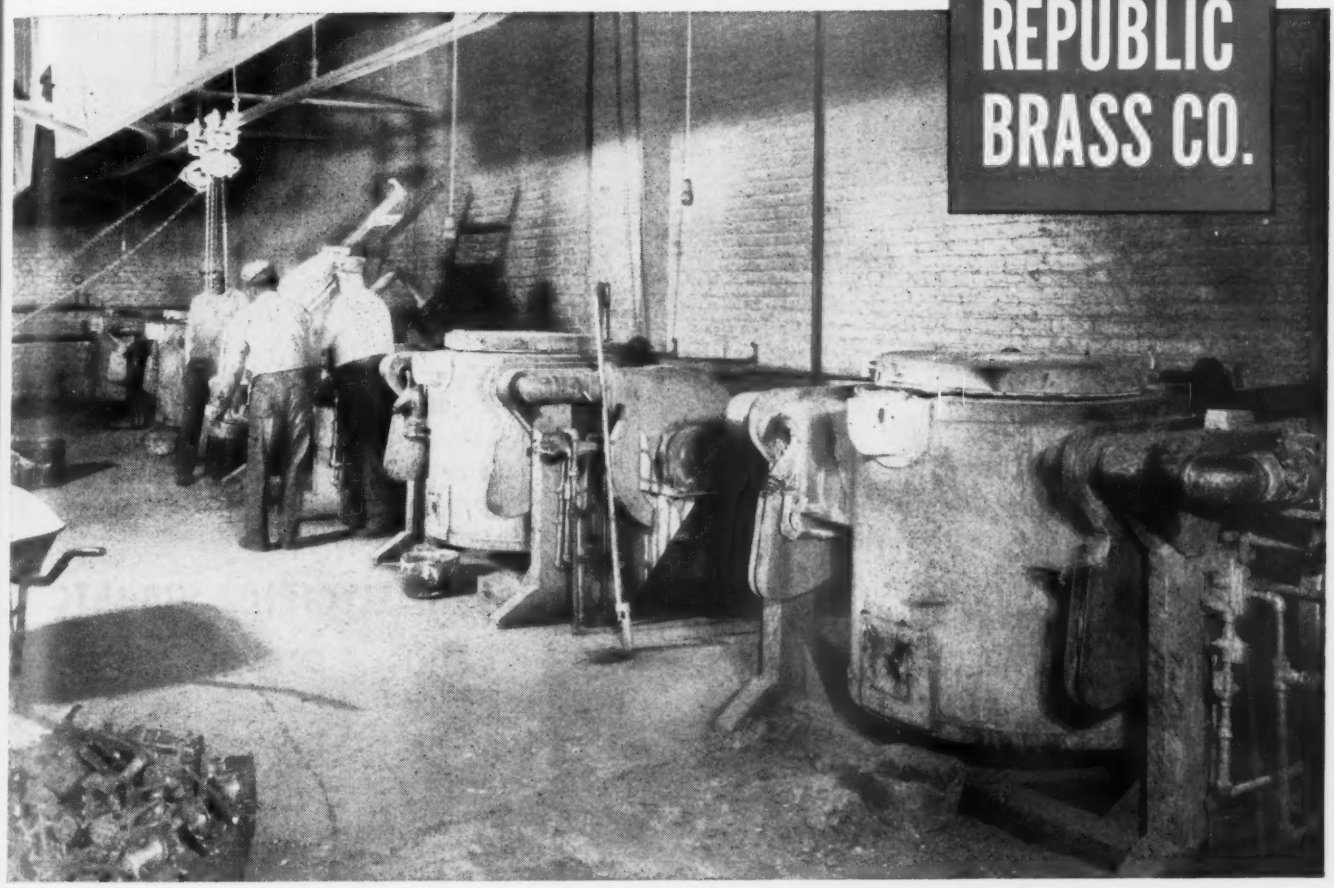
**ROTO-CLONE is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

American Air Filter
COMPANY, INC.

266 Central Avenue, Louisville 8, Kentucky • American Air Filter of Canada, Ltd., Montreal, P. Q.

6 LINDBERG-Fishers for 6 years

and all's well at REPUBLIC BRASS CO.



LINDBERG-Fisher BRASS MELTING FURNACES STAND THE GAFF

All's well at The Republic Brass Co., (Division of Briggs Mfg. Co.), Cleveland, Ohio—manufacturer of water faucets and related plumbing fixtures. In 1945, as part of a modernization program, Republic installed six Lindberg-Fisher brass melting furnaces. These oil fired, constant arc, nose-pouring furnaces have more than withstood the test of time . . . and maintenance has been almost nil.

Here's what Mr. J. J. Smith, Republic's foundry superintendent thinks of his six Lindberg-Fisher brass melting furnaces:

"We have had six Lindberg-Fisher brass melting, nose-pouring, 1200 pound capacity furnaces for six years, and have had very good results from them . . . they deliver more than 100 heats per crucible . . . one hour twenty minutes per heat . . . 18 months lining life. They have performed very satisfactorily as to upkeep, and we have had excellent operating results."

Check these advantages of Lindberg-Fisher Hydraulic Nose-Pouring Melting Furnaces

- Constant pouring arc regardless of degree of furnace tilt.
- Rate of pouring always under positive and constant finger-tip control.
- Special trunnion mounting permits lower construction than hand tilting furnace.
- Reduced height facilitates charging cold metal, and observation of metal.
- Metal waste and pouring hazard greatly reduced by closeness of ladle to pouring spout.
- Labor saving . . . simple control enables one man to pour and transfer metal.

Write for Bulletin No. 57-A for more information on MNP-Motorized Tilting and HNP-Hydraulic Tilting Constant Arc Nose-Pouring Furnaces.

LINDBERG-Fisher MELTING FURNACES

Lindberg Engineering Company, 2453 West Hubbard Street, Chicago 12, Illinois

YOU'LL DO A BETTER JOB

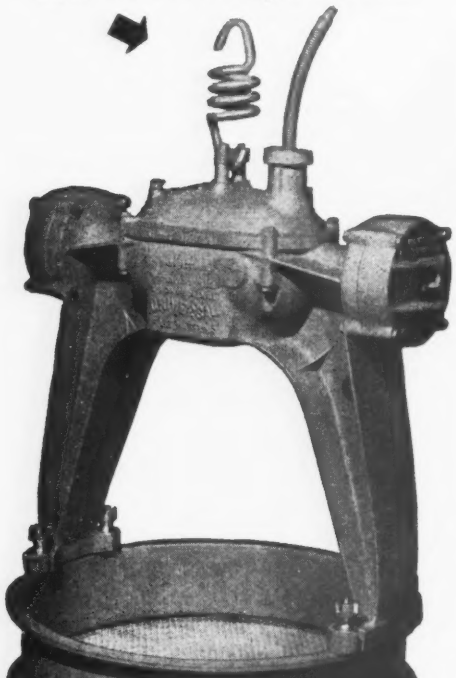
with H. V. ADAMS DESIGNED

HIGH EFFICIENCY FOUNDRY TOOLS

"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

with the Double Eight Vibration

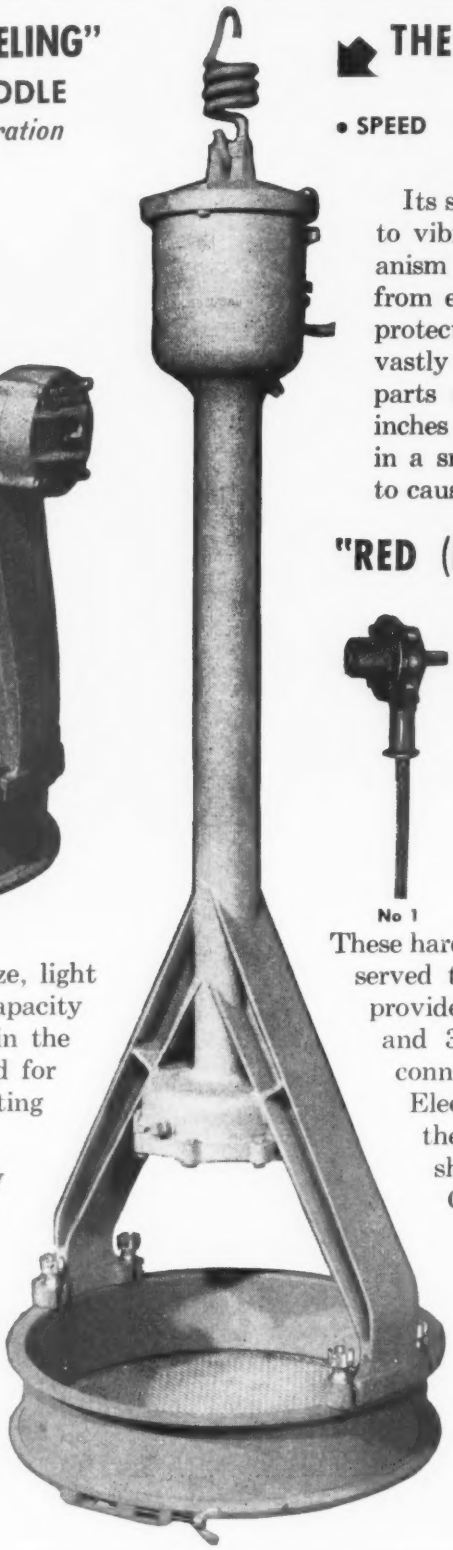


Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.



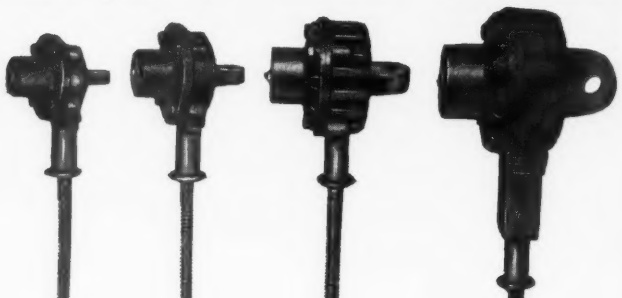
THE "ROTOPLANE" SPEED SIFTER

WILL GIVE YOU

• SPEED • ECONOMY • SAFETY • LONGER LIFE • GREATER SIFTING CAPACITY

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area—are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

"RED (Devil) ELECTRIC" VIBRATORS



No 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

Other Foundry Products:

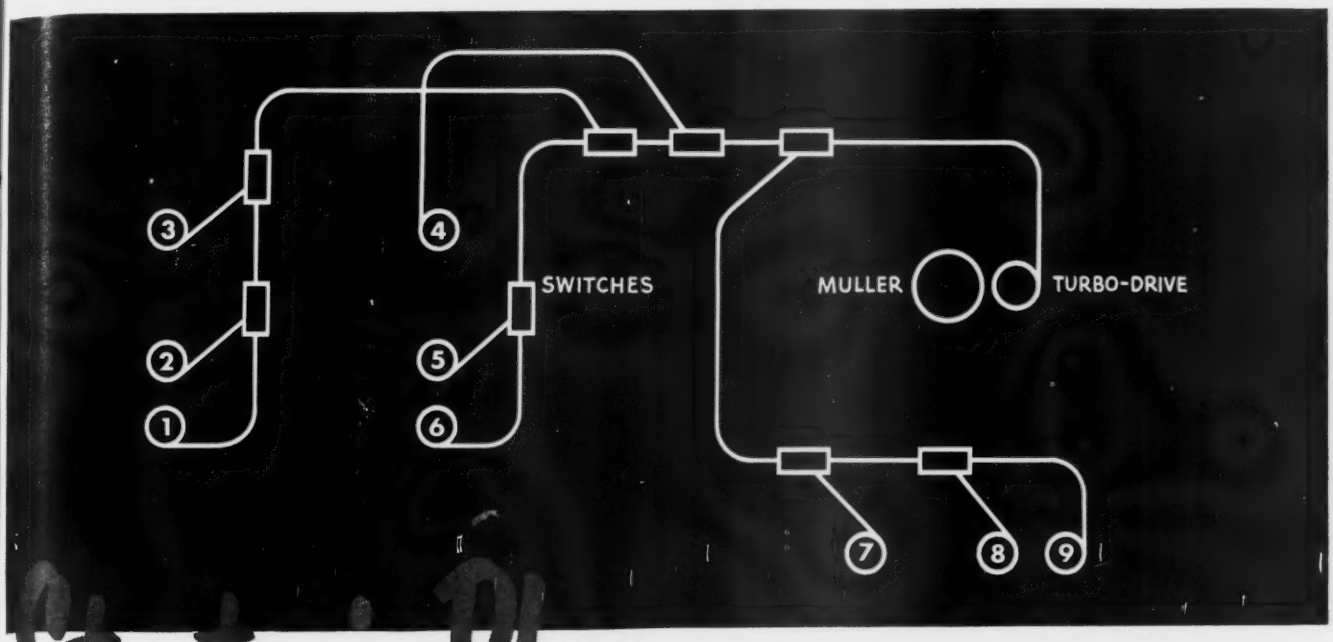
- **No. 11 NOISELESS TYPE VIBRATOR**
- **A-20 ELECTRIC VIBRATOR**
- **RED ELECTRIC KNEE SWITCHES**
- **"ROTO" ADJUSTABLE BIN VIBRATOR**
- **2 MIN. UNIVERSAL FINENESS TEST SIFTER.**
- **UNIVERSAL TRIPOD CARRIER**

ORDER ALL SIFTERS AND VIBRATORS WITH GROUND WIRE!!

FOUNDRY SUPPLIES MANUFACTURING CO., NOT INC.

2221 Orchard Street - Chicago 14, Illinois

Established 1918 **Cable Address: "Rotoplane Chicago"** **H. V. ADAMS, Mgr.**



Strategic Plan FOR ANY SIZE FOUNDRY

CRANE *TURBO-DRIVE*

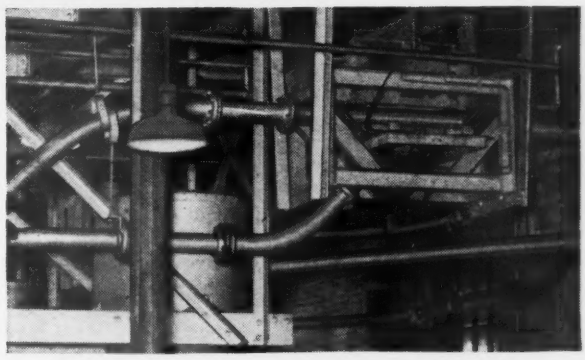
Cuts Cost of Handling Core Sand at WARDEN-KING Foundry

The diagram above is an important clue to the cost-cutting efficiency of the Warden-King, Ltd., Foundry in Canada. It's a layout of the unique Crane *Turbo-Drive* system that automatically delivers any mixture of mulled core sand in 500-pound batches, *as required,* to any of nine core blowers. Delivery time for a 175-foot run—23 seconds.

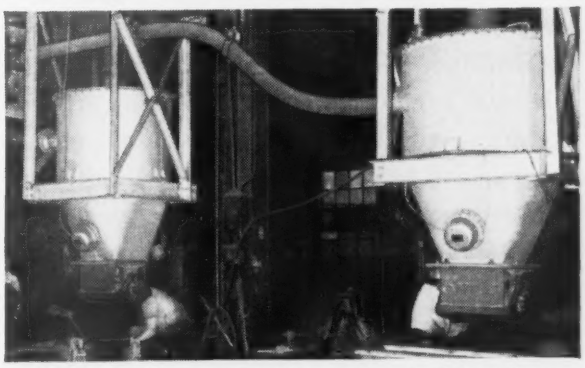
Economical compressed air provides the push—and all sand movement is within 4-inch steel piping and automatic transfer switches well above work floor activity. One man—the muller operator—easily handles the entire sand delivery job merely by flicking switches at the master control panel.

TURBO-DRIVE ADVANTAGES: High-Speed Sand Delivery . . . Cleanliness . . . Safety . . . Flexibility of Installation . . . Lowest Maintenance Cost . . . Plus Big Savings in Man Power. Warden-King, for example, is saving 6 man-hours per shift.

INITIAL COST: Lower than any equivalent sand transporting system. Use the coupon below to get full information.



Mulled sand travels through steel piping and single transfer switches to point of use. A multiple switch serving up to 14 stations also available.



9 core machines are served by a 7 cu. ft. Turbo-Drive unit installed at the muller. 15 and 30 cu. ft. units meet needs of larger foundries.

CRANE CO.

General Offices: 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas.

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Gentlemen: Yes, I would like Turbo-Drive literature ☐.
Please have a representative call ☐.

Name_____ Title_____

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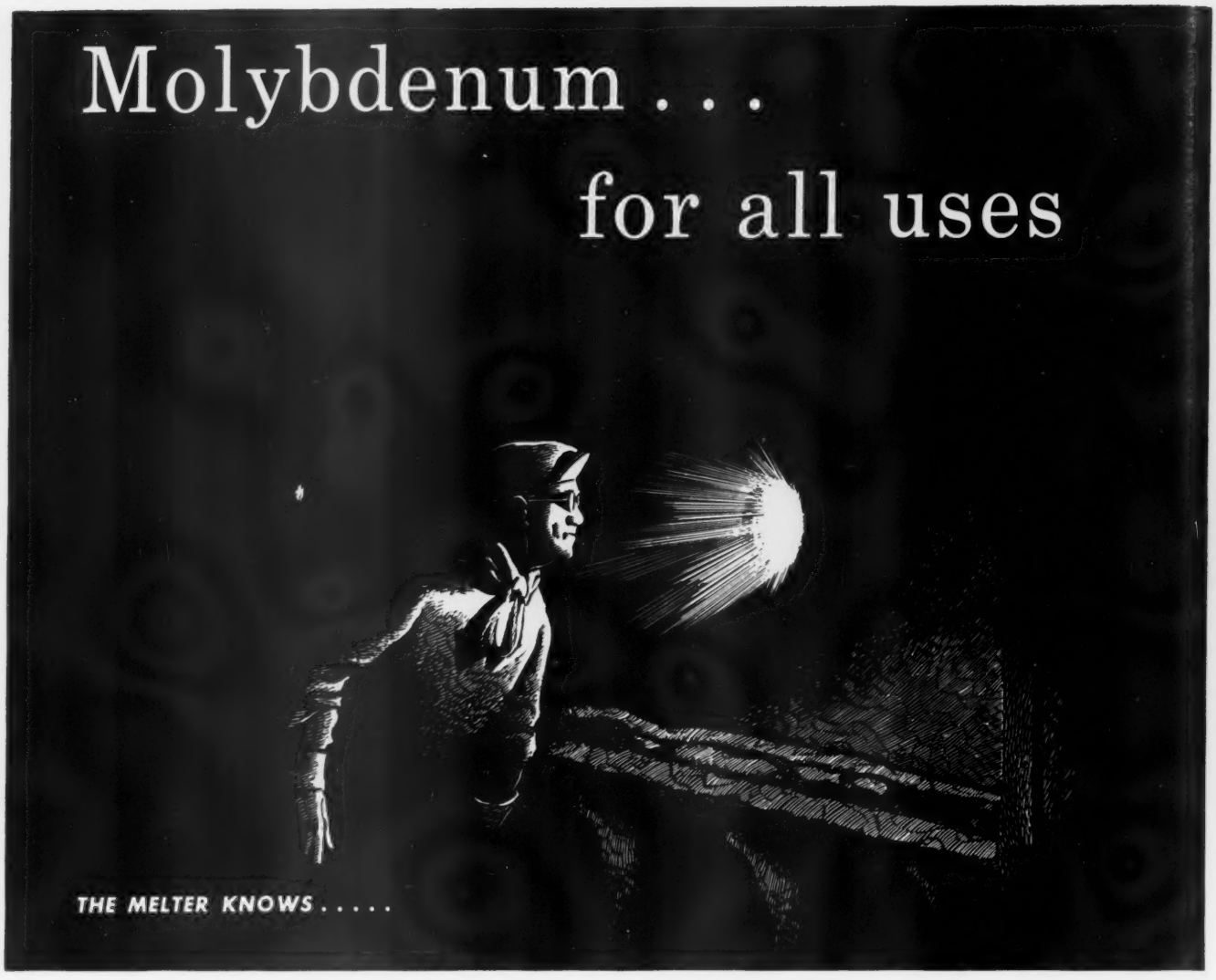
Molybdenum . . . for all uses



Melting progress in iron and steel has set the pace in design of today's equipment. Here in its formative stages, the future of iron and steel is determined. Now that Molybdenum has been released for unrestricted civilian production, higher standards may again be resumed in this competitive field.

The experienced melter knows he can depend on MCA Molybdenum additions for uniformity of results. And whether the prime objective is to improve deep hardenability, eliminate temper brittleness, improve machineability, or upgrade some other physical or metallurgical property, MCA "Moly" has an envious and honorable reputation.

In fact, MCA Molybdenum has become the standard of comparison and the leader in its field, through constant technical research and application in the metallurgical industry.

As recognized authorities in the application of Molybdenum, Tungsten, Boron, Rare Earths, and the alloys and chemical elements of these materials, MCA assures confidential and immediate response to inquiries.

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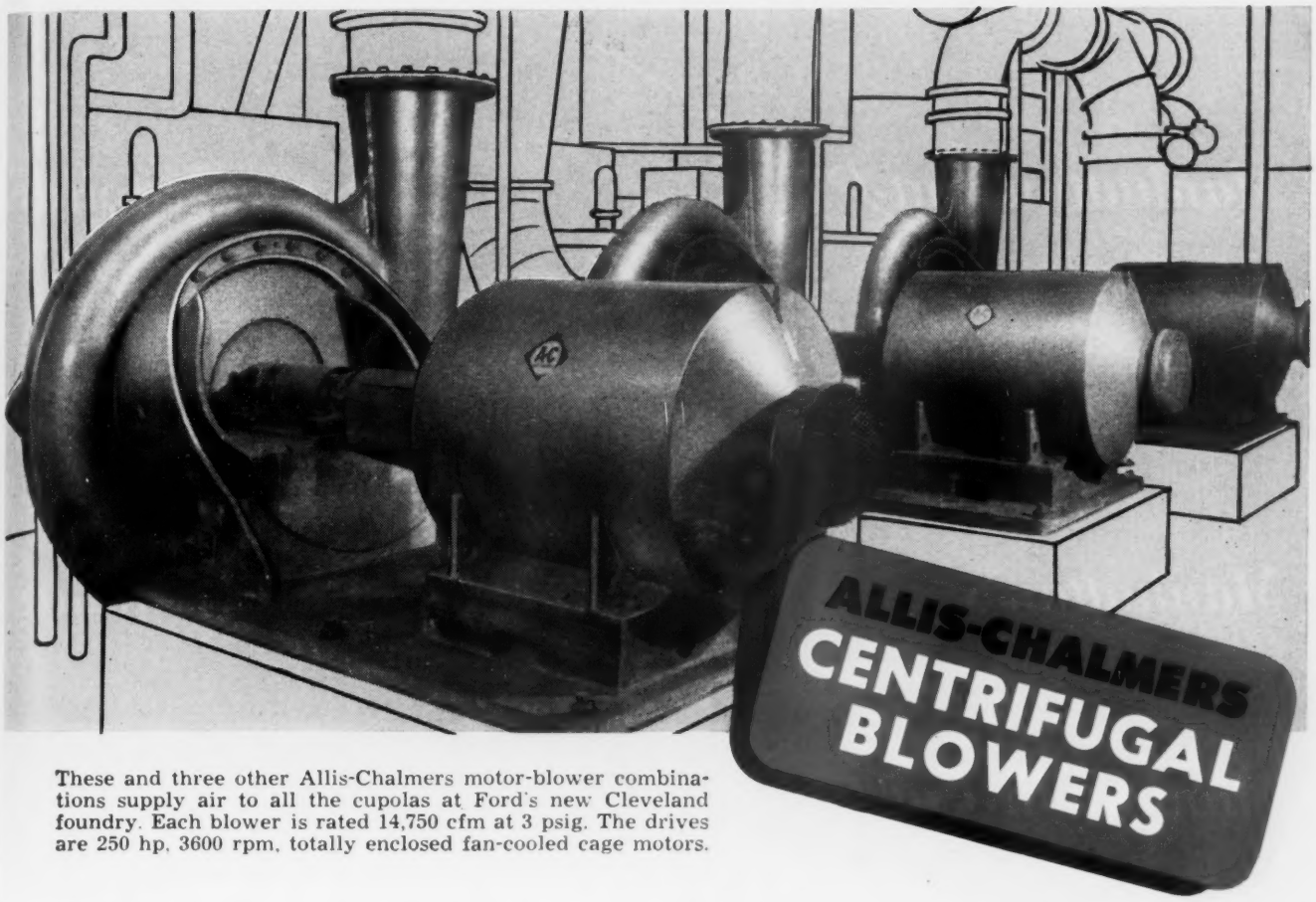

These and three other Allis-Chalmers motor-blower combinations supply air to all the cupolas at Ford's new Cleveland foundry. Each blower is rated 14,750 cfm at 3 psig. The drives are 250 hp, 3600 rpm, totally enclosed fan-cooled cage motors.

Ford CHOOSES 'QUICK-MAINTENANCE' BLOWERS AND TEFC MOTORS

AFTER LONG AND SUCCESSFUL EXPERIENCE with Allis-Chalmers centrifugal blowers at other plants, the Ford Motor Company naturally chose the same make for their fine new Cleveland foundry, one of the world's largest.

Ford ordered the finest...six single stage centrifugal blowers with Quick-Change rotating assemblies. And for drives, again Ford ordered the finest... six Allis-Chalmers tube type, totally enclosed fan-cooled motors to withstand any possible air contamination.

Time is exceedingly vital when the manifold operations of a huge manufacturer must coordinate precisely . . . therefore reliability and speed of maintenance must be beyond question. In this special blower design, removal of spacer coupling allows the impeller, shaft, bearing and backplate to be removed as a unit—greatly speeding any possible maintenance. Allis-Chalmers precision manufacture makes the six impeller assemblies—and those of five more blowers ordered at the same time for another Ford plant — completely interchangeable.

Quality control also being vital, the blowers are equipped with constant air weight controls on the inlet guide vanes to deliver automatically a metered amount of air and insure uniform melts.

For the full story on how *your* foundry also can secure such reliable, compact, accessible and precision air-moving equipment, call your nearest A-C office or write to Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 16B60-18B. A-4000

Foundromatic and *Regulex* are Allis-Chalmers trademarks.

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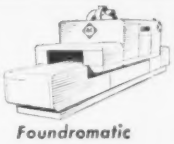
Foundry Equipment for Bigger Output—Better Working Conditions!

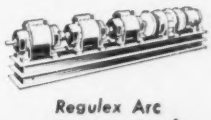
Foundromatic Shakeouts

Motors-Drives Control



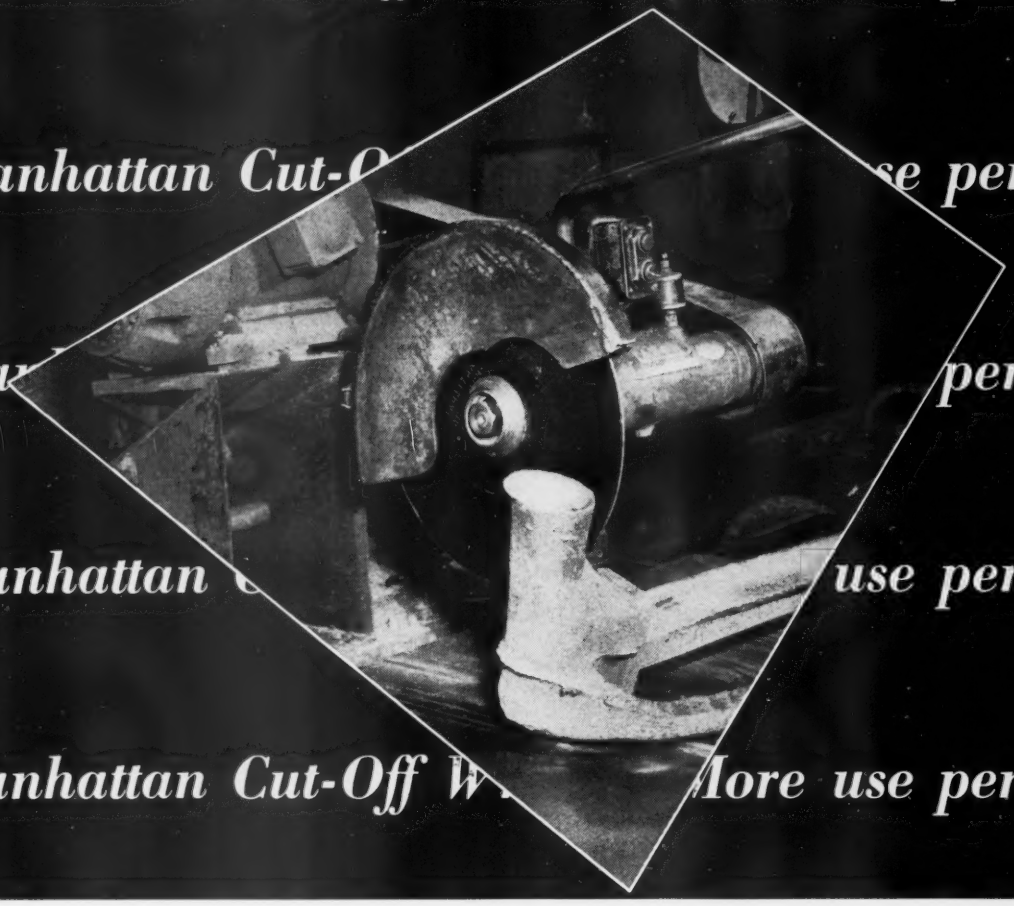
Foundromatic Core Dryer

Induction Heating & Melting



Regulex Arc Furnace Control

Manhattan Cut-Off Wheels—More use per dollar



Manhattan Cut-Off Wheels—More use per dollar

REINFORCED FOR FOUNDRY CUT-OFF . . . Manhattan Reinforced Cut-Off Wheels are specially designed to perform under conditions of side-strain far beyond the limits of ordinary cut-off wheels . . . to perform safely and dependably under the toughest operating conditions. The result — more and faster work . . . with safety . . . at real savings to the foundry owner.

Try Manhattan Reinforced Foundry Cut-Off Wheels and note how their special lateral reinforcement gives you MORE USE PER DOLLAR. You will also find similar engineering features built into other Manhattan abrasive and diamond wheels.

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WRITE TO ABRASIVE WHEEL DEPARTMENT

R/M

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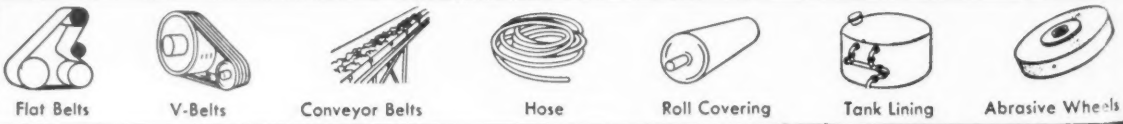
RAYBESTOS-MANHATTAN, INC.



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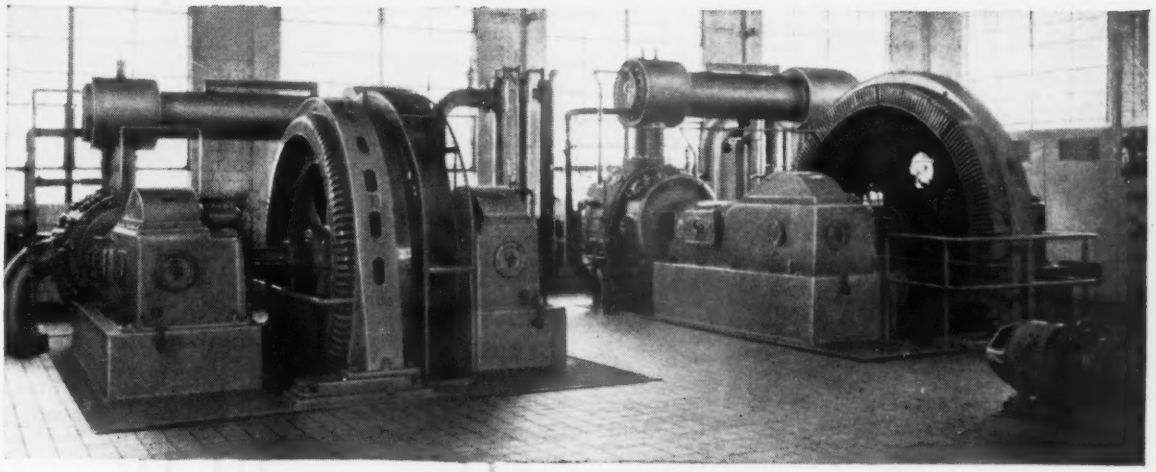
NO CLOCK PUNCHING

for these compressors



That's right! There's no daily time limit placed on the work output of Chicago Pneumatic Class O-CE Compressors . . . they operate "around the clock" with a minimum of attention. Designed for continuous, year-in, year-out heavy industrial usage, these units are unsurpassed for a dependable air power supply at low cost. Built in sizes up to 2,000 hp, for pressures up to 5,000 lbs., they are available in horizontal, two-stage, water-cooled types with direct-mounted synchronous motor drive.

The Chicago Pneumatic Class O-CE Compressor is equipped with roller bearings, Simplate valves for low power consumption, streamlined air passages to cut down air flow resistance, CP Multi-Step Control for partial load economy, and a CP Intercooler for maximum heat transfer and low water consumption. Ask for Bulletin 726. *Chicago Pneumatic Tool Company, 8 East 44th Street, N. Y. 17, N. Y.*

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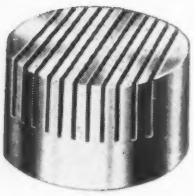
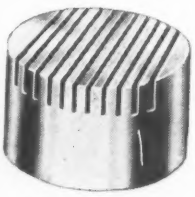
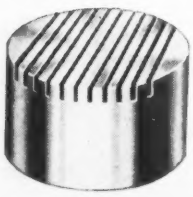
SMILLIE
CORE BOX VENTS
"A Specific Type for Every Core Box"
Slotted



X-TRA DEEP HEAD
.156
Wide Slots
.014

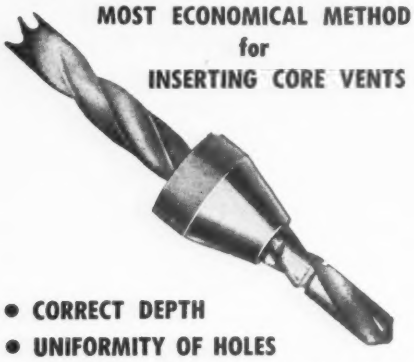
DEEP HEAD
.093
Wide or Narrow Slots
.014 .010





SHALLOW HEAD
.031
Wide or Narrow Slots
.014 .010

INSERTING DRILL
MOST ECONOMICAL METHOD for INSERTING CORE VENTS



- CORRECT DEPTH
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Readers' Comment

How To Train Apprentices

TO THE EDITORS:

Considerable variation of opinion was expressed by a group of foundrymen at a recent meeting on the subject of apprentice training and the amount of education to which an applicant should aspire before and during the training period.

One member definitely was opposed to the class idea of training apprentices. He claimed that with some boys it is a waste of time. With others it put false notions in their minds. They became dissatisfied with their jobs in the foundry. If he had his way he would place the apprentice for an hour several times a week with the foreman or a highly skilled molder to learn the why and the wherefore of foundry processes. That is all the special education the foundry apprentice needs.

At the other extreme another member claimed that the foundry now is more or less scientifically controlled, and the more a boy could learn of the technical side of the business the better chance he would have of understanding what was required of him.

Many practical foundrymen will be inclined to agree with the views of the first speaker. In the great majority of instances the apprentices who complete their terms will work as molders for the remainder of their active existence. A certain number have no ambition to improve their condition. Some are temperamentally unfitted either through natural timidity or laziness—mental or physical—to occupy positions of responsibility.

Only a comparatively small number ever will wiggle upward to positions where a comprehensive technical and practical knowledge is required. Members of this small group invariably are endowed with sufficient initiative, perseverance and curiosity to acquire the necessary education for themselves.

The utopian dream of some foundrymen of filling their shops with a group of highly skilled technical and practical men is no more practical than an attempt to drill a regiment made up entirely of colonels, or operate a vessel in which every member of the crew carries a master's ticket. So long as human nature is human nature and so long as industry depends on manual labor, some men will have to hew the wood and carry the water.

By all means encourage the promising lads. They are few and will meet your efforts more than half way. Attempt to instill technical or theoretical knowledge in the others represents wasted effort.

AN EX-TRAINER

* * *

Doing It the Hard Way

TO THE EDITORS:

An interesting article by Pat Dwyer in the May 1951 FOUNDRY, detailing the foundry technique involved in making a cup, saucer and spoon as a single casting, suggests that

you and some of your readers might be interested in the accompanying illustration of one of these apprentice test castings with four spoons.

FRANCIS D. ROPER
Instructor
The National Foundry Craft Training Center
West Bromwich, Worcs., England

* * *

Proceed with Caution

TO THE EDITORS:

It would seem there is a lot of misunderstanding and confusion developed among foundrymen and casting users regarding the new shell molding process. Claims are being made regarding the elimination of machine operations, and holding tolerances to 0.002 and 0.003-in. Many casting users are going overboard in designing parts with machining eliminated.

There is no question that some of the larger foundries with the latest

(*Concluded on page* 98)

"I'll get to BUFFALO ANY WAY

...to get those BETTER BUFFALO PATTERNS"

If they walk or ride or swim,
For miles around smart foundry men
Can now be heard to plainly say,
"I'll get to Buffalo ANY way."

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Will FIT your foundry, kindly note,
No extra rigging you can bet,
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Production schedules really zoom,
And to truly dissipate your gloom,
Scrap ratios hit an all time low,
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New, Larger COVER GOGGLES

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New CESCO **Cover Goggles** fit well over all popular styles of glasses— even over extreme types such as these.

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Lightweight, sturdy plastic with contoured edges. Weight is well-distributed for comfort and safety.

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Slots in edges of lens frames and rings are offset to baffle air flow.

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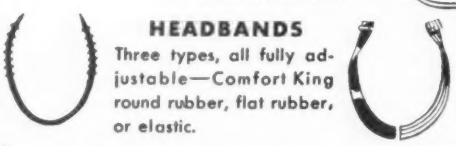
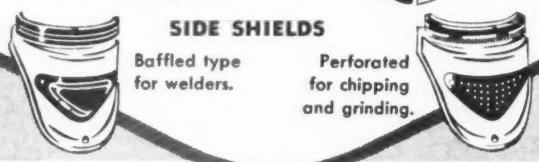
Three types, all fully adjustable—Comfort King round rubber, flat rubber, or elastic.



SIDE SHIELDS

Baffled type for welders.

Perforated for chipping and grinding.



The *NEW* CESCO series 548 and 549 Cover Goggles are 20% larger than former cover goggles and will fit comfortably over all popular styles of men's or women's glasses. Newly designed, contoured edges eliminate pressure points on the nose and seal out flying particles or light flashes. Larger air space within goggles reduces fogging.

Screw-type retaining rings permit quick lens change from front. Standard 50mm lenses set flush with rings to deflect flying objects. Chippers style has indirect ventilation through slotted lens rings and direct ventilation through perforated side shields. Welders and dust models have indirect ventilation through side shields. Simplified bridge adjustment. Choice of 3 adjustable headbands: elastic, flat rubber or Comfort King round rubber.

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(Concluded from page 96)

equipment and technical personnel will be able to produce shell molded castings to accuracies unheard of up to the present. Certainly this does not apply to the average jobbing foundry.

In our estimation shell molding is the greatest advance in foundry technique in a period of many years. It offers many advantages over conventional sand casting methods. Following include some of the advantages from the users' standpoint: Castings can be produced with a surface finish superior to that of any similar casting made in a sand mold. Reproduction of pattern detail is brought out to the highest degree. Castings can be produced with clean knife edges. With proper shrinkage allowance castings are closer to pattern size. No appreciable *skin* effect results in better machinability with any metal. A machine cut as light as 1/64 in. can be made on shell molded castings with no detrimental effect on tool life. Savings up to 20 per cent in rough castings due to reduction in finish allowance. Savings up to 25 per cent in machining labor due to removal of less metal.

From the foundry or casting viewpoint the following advantages may be included: Up to 30 per cent less metal required per mold. Up to 45 per cent less metal for gates and sprues. Cleaning and grinding cost reduced up to 30 per cent. Molding cost reduced up to 50 per cent. Cost per pound actually is less than in conventional sand molding practice. In support of that last item, and after producing shell molded castings for the past 1½ years, we are convinced they can be produced at the same cost, and in some instances at less cost than sand castings.

Pattern equipment to the user is a higher item of expense than equipment for castings molded in sand in the conventional manner. The old maxim still stands: "Castings are only as good as the pattern." Where castings with the qualities and advantages enumerated are to be produced, suitable equipment must be used. Obviously it will cost more.

If foundrymen will forget the elimination of machining, with tolerances of 0.002 and 0.003, and offer the advantages listed in the foregoing presentation, we are sure it will be sufficient to induce many casting users to give consideration to these and many other favorable features of shell molded castings. The foundryman's job will be easier and users of castings will have no illusions.

W. S. THOMAS
Vice President
Emmaus Foundry & Machine Co. Inc.
Emmaus, Pa.

Packed in Bags and Shipped on Pallets

Each bag holds 25 lb. of contained vanadium, so additions can be made without weighing. Bags prevent contamination and are shipped on pallets for easy and economical handling.

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You can handle additions of vanadium conveniently and economically with ELECTROMET ferrovanadium packed in bags.

Check these advantages:

- *Convenient Packaging*—The alloy is packed in strong five-ply, paper bags. These bags have a wide blue band across the middle, as well as blue edges and bottom, for positive identification. The bags prevent contamination and preclude any chance of mix up with other alloys.
- *No Weighing*—Each bag (25 lb. of contained vanadium) can be added without weighing.
- *Handling Costs Reduced*—Pallet shipments are available at no extra charge. Each pallet holds about 4,000 lb. of ferrovanadium—2,200 lb. of contained vanadium. Pallets can be conveniently unloaded and handled in your plant by lift truck or overhead crane. Handling costs are reduced and inventory-taking is simplified. And you don't have to return the pallets.
- *High-Quality Material for Every Need*—ELECTROMET ferrovanadium is uniform in analysis, closely graded, correctly sized, and physically clean. It is furnished in four grades:

	Vanadium	Silicon max.	Carbon max.
High-Speed Grade	50 to 55%	1.50%	0.20%
Special Grade	50 to 55%	2%	0.50%
Open-Hearth Grade	50 to 55%	8%	3%
Foundry Grade	50 to 55%	approx. 10%	3%

✻ **Immediate Delivery**—Vanadium is readily available and can frequently be used in engineering steels to replace part, if not all, of certain scarcer alloys.

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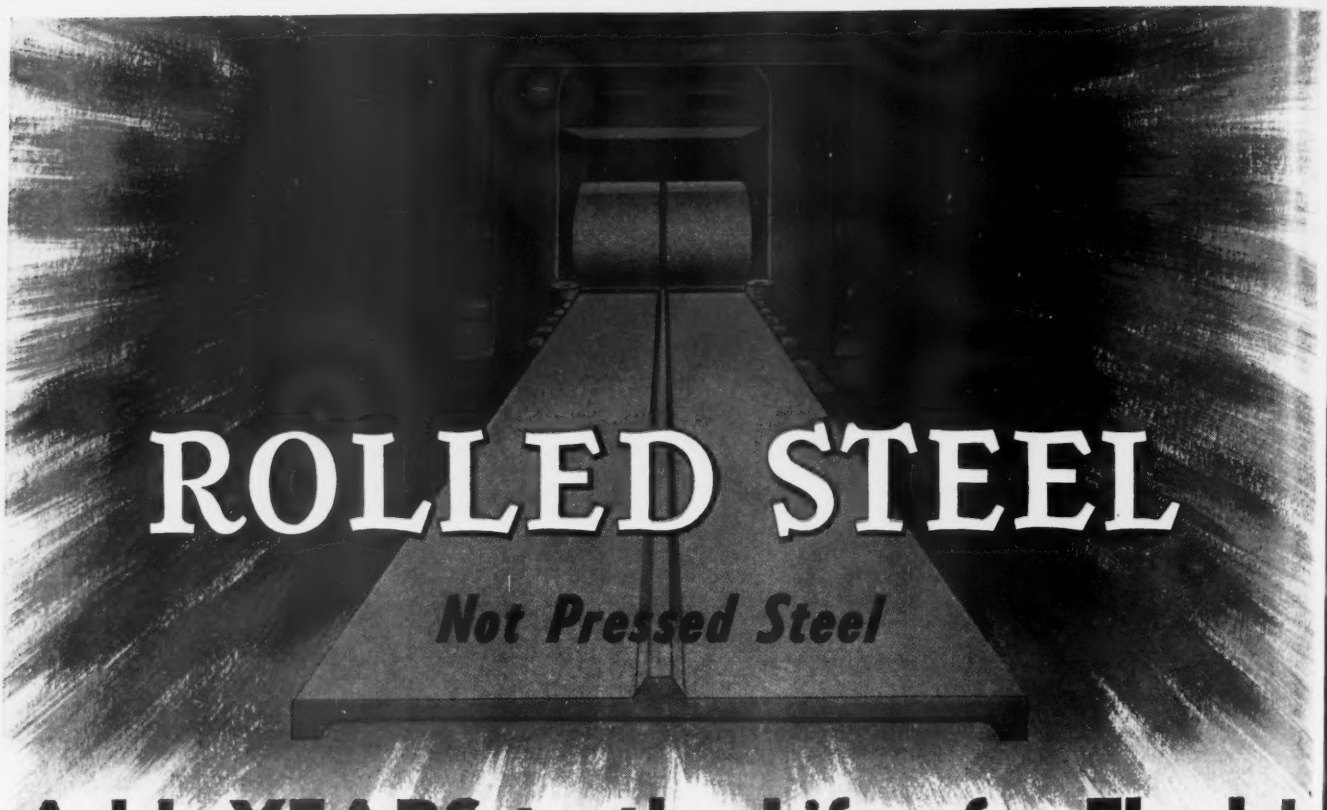
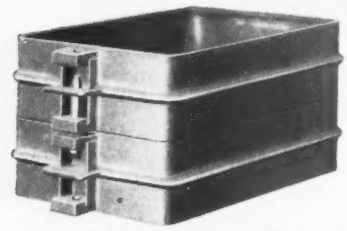
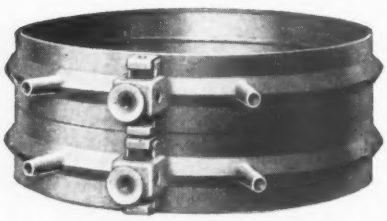


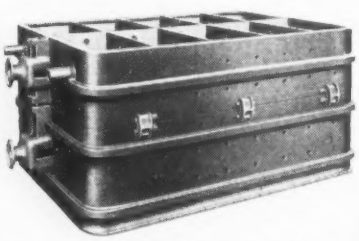
Adds YEARS to the Life of a Flask!



Style "AD" Flask with Double Pin Lugs.



Style "BLDT" Flask with Trunnions and 2-man Lift Handles.



Heavy Duty Flask, style 3/8 ND-RTX cope and 3/8 NS-RT drag, with clamping bars and clamps.

Every Sterling Flask is carefully fabricated from special hot rolled steel channel having a tensile strength of 70,000 lbs. The steel also has controlled carbon content and copper bearing . . . features that add years to the life of the flask, even under tough everyday usage. This construction gives you the practical combination of maximum strength with minimum weight. It assures accuracy and speed in molding. Check these distinctive Sterling features: All-steel welded into one solid, rigid piece . . . A rib rolled in the center of each section to resist torsional and other strains . . . Heavy rolled steel sand flanges with square corners and full width bearing . . . Partings accurately machined, not just surface ground, but planed to an accuracy of .005". And there's plenty of metal left for re-machining if necessary. Frankly, can you think of any other foundry flask that gives you so many life-prolonging features?

Consult Sterling when in need of foundry flasks or other foundry equipment.

Sterling

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A 7272-1P-CR

Can You Point with Pride?

A heavy travel schedule throughout the country permits me to see the inside and outside of many foundries. While a sizable number of companies have well-kept buildings and maintain good housekeeping conditions in all parts of the property, entirely too many foundries obviously have paid no attention to this problem.

A great deal has been said from time to time about the need for a light, clean and safe place in which to work. Good-housekeeping programs have stressed the importance of such facilities as the first step in attracting an adequate supply of workers and encouraging the production of a quality product. As a result of attention given to that phase of foundry operation, progress has been made in the improvement of foundry production facilities.

But not enough attention has been devoted to the appearance of foundry and office exteriors, or to housekeeping in the plant area. In too many cases building maintenance has been neglected. Many are sadly in need of an application of paint. Dirt and rubbish litter the yard immediately surrounding the plant. Storage yards for those materials which can be kept out of doors frequently are disorganized. Little attention seemingly is paid to the orderly storage of flasks outside the plant, so that this yard is an eyesore and provides a hazard to safety.

All too often, a foundry is about the worst run-down plant in the area. Surely this is poor community relations. How can the neighbors take pride in an organization that apparently does not take pride in itself? And if there is no interest or pride on the part of the community, how can the foundry expect to obtain an adequate supply of workers?

In recent years, greater attention has been paid to the intelligent marketing of castings. It would seem that appearance of the plant and its surroundings has an important bearing on the sale of castings. How can a customer, after seeing a poorly kept plant, have confidence that the foundry can produce the quality castings required?

Why not take a good look at the exterior of your plant? If it is not in first-class condition—comparable with other industries in the district—organize a clean-up paint-up campaign.

In so doing you will be taking an important step in establishing better community, personnel and customer relations.

Frank G. Steinbach

Editor

BRITAIN

By E. LONGDEN
President
Institute of British Foundrymen

AN ASSESSMENT of foundry progress achieved in Britain during the past decade must take into account the wartime arrest in prewar, relatively steady 2½-3 per cent annual increase in productivity rate. The apparent postwar progress has been accelerated by the deferred advances in general knowledge as a result of the concentration on special wartime needs.

Gray Iron Metallurgy—The outstanding advance in gray iron metallurgy is undoubtedly the development of the nodular or spheroidal graphite metals. Announcement that it had been found possible to produce gray cast irons in the as-cast state with the graphite in a substantially nodular form, without subjecting the material to a heat treatment process, first was made by the British Cast Iron Research Association in 1946. A technical description of the process, naming the element used, cerium, followed in 1948 and in the same year the International Nickel Co. announced that similar structures could be obtained by the use of magnesium.

Today, these new materials are well established on a production basis, and the magnesium process can be employed to produce nodular structures in both hypoeutectic and hypereutectic irons. It has been shown recently that certain subversive elements present in some raw materials, which interfere with nodular structures produced by the magnesium treatment, can be neutralized effectively by addition of very low quantities of cerium.

Prior to the introduction of nodular irons, improved properties obtainable from the acicular nickel-molybdenum cast irons developed in Great Britain and the United States had influenced the revised British Standard Specification for iron castings published in 1948 and had raised the minimum requirements for the highest grade of iron specified.

Stress relief heat treatment of medium and heavy gray iron castings has made considerable headway, especially with alloy metal.

Malleable Iron—Old methods of packing and charging are fast disappearing and are being replaced by battery-operated fork-lift trucks, car hearths and removable oven chambers. Continuous car-type ovens have been established in many foundries. Heat is supplied by the combustion of gas, creosote oil or pulverized coal. A most interesting progression has been the successful development of the principle of annealing by controlled gaseous oven atmospheres.

Bay for large castings at Metropolitan-Vickers' foundry is 310 x 776 ft, 55 ft to the crane track

A Special Report On European Foundry Progress

Atmospheres may be controlled to give neutral or decarburizing conditions. Furnaces are mostly heated through radiant tubes from city or producer gas, or by electric radiant elements. Controlled atmosphere annealing shortens the malleabilizing stage, results in material economy and assures better control of the annealing cycle and a more constantly reliable quality in the casting.

Large tonnages of pearlitic malleable cast iron are now regularly supplied to the consuming section of industry.

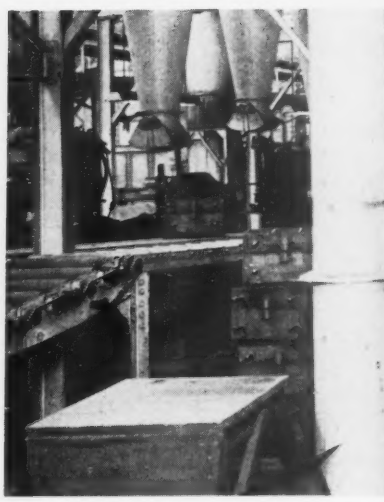
Cast Steel Metallurgy—Formation of the British Steel Castings Research Association some years ago signifies the importance which the British steel foundry industry attaches to research. It marks an important stage in development of steel casting resources in the United Kingdom. The BSCRA is an autonomous research organization. It is financed by its member firms, to whom its findings are issued on a confidential basis, similar to that observed by the Steel Founders' Society of America.

BSCRA research is carried out by the staff at its own well-equipped research stations, certain universities and at the laboratories of industrial concerns. Researches have covered a wide field of steel casting science and foundry technology, including research into industrial health and dust suppression. The BSCRA Dust Research Station in Sheffield has been in operation since mid-1951. Manufacturers of steel castings in Britain can claim to be the first section of the casting industry to set up an experimental unit for dust suppression.

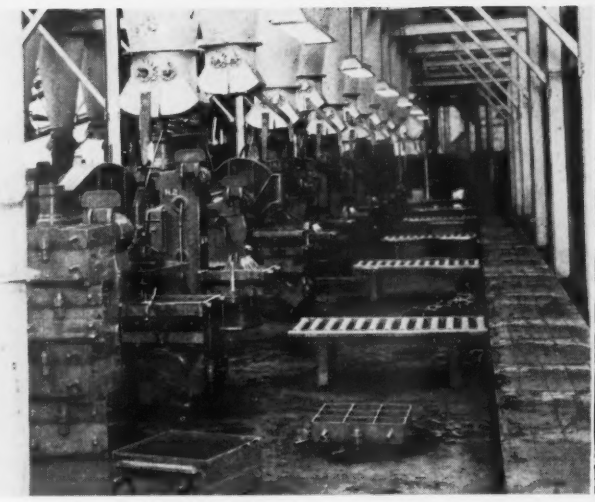
Important advances have been made in relation to nondestructive testing of steel castings, in particular toward more conveniently applied techniques. Research into the mechanism of freezing steel in refractory molds is leading to the establishment of essential basic data. Work on the problems of penetration of metal into sands has been proceeding satisfactorily and has led to an improvement in the surface finish of castings. Researches relating to influence of molding materials upon hot tearing in steel castings has yielded much information and a paper on the subject was presented at the Chicago convention of the American Foundrymen's Society.

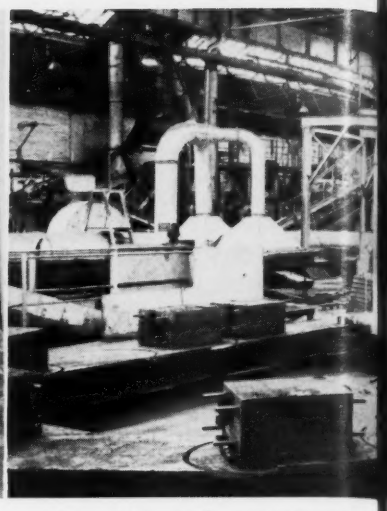
While the car-hearth type of annealing oven, fired mainly by producer gas, is generally favored, ovens fired by electric radiation elements are now being adopted rapidly.

Coreroom at Metropolitan-Vickers is heated by electric wall heaters. Coke baking ovens are gas-fired



Molding stations at the highly mechanized British Railways' foundry for production of track supplies





Mold conveyor line at the British Railways' foundry. Annual capacity of the plant is 70,000 tons

Nonferrous Metallurgy and Practice—Due mainly to the excellent work of the British Non-Ferrous Research Association, the past decade has witnessed considerable reorientation of views on many metallurgical problems inherent in production of nonferrous castings, especially tin bronzes, aluminum bronze and aluminum alloys.

Studies of solidification period of metals indicate that pure metals and alloys of short freezing range solidify progressively from the outer mold contact surfaces until the whole is solid. Sound castings may be obtained if the casting freezes progressively and is supplied with liquid metal from properly designed feeder gates and heads. Alloys of long freezing range which do not pass through a decided solidification rate from the outside cooling face, but through a pasty stage, depend upon the comparatively tortuous and slow capillary movement of metal through the solidifying skeleton structure and, finally, from suitably designed feeder gates favoring progressive feeding.

Investigation into the effects of reactive gases on soundness has indicated clearly that hydrogen absorption is a major cause of unsoundness, especially in copper-base alloys. It has been established that oxygen contamination is not the very unfavorable element as at one time thought to be. It is considered advisable to create early controlled slight oxidizing melting conditions to avoid hydrogen absorption. It is considered that alloys containing more than small percentages of nickel may absorb hydrogen, oxygen and carbon, which, on reacting, liberate carbon monoxide gas during solidification. Melting under oxidizing conditions is, therefore, practiced to avoid contamination of the melt by hydrogen and carbon. Deoxidation procedure is more readily dealt with in refining stages. The net result of investigations is that the nonferrous foundry industry now is steadily adopting two systems for gas elimination and gas neutralization, namely oxidation treatment and gas scavenging, usually employing nitrogen.

Melting Furnaces—Considerable improvement has been made in the standards of cupola practice. This has been accelerated by difficulties of fuel supplies since the war and regulation of practice resulting from technical improvements accruing from the more precise control needed to produce modern versions of high-duty gray irons. Considerable interest and some development has been experienced in the adoption of hot-blast cupolas. With a desire to ensure lining contours, especially in hot-blast cupolas, water-cooling of the lining in the melting zone of the furnace has been applied successfully.

Oxygen-enriched air is, in increasing measure, finding favor for experimental and special cupola practice, but particularly in steel melting practice in a more general routine way.

Considerable expansion in steel casting manufacture has been met by a greater proportionate use of electric furnaces. While the electric-arc furnace is responsible for the relative bulk increase in total melts, the high-frequency induction furnace largely has replaced crucible melting, especially for small intricate castings made in sand and investment molds, but also for aluminum die-casting.

Continued progress is registered in use of rotary types of furnaces for melting metal for malleable iron castings, employing pulverized coal and oil. Greater use is now made of the furnace types incorporating recuperating equipment which takes advantage of the exhausting hot gases.

Mold and Core Drying—More precise control over temperature and circulation of drying gases has been developed generally, employing, mainly, city gas or pulverized coal. Both horizontal and vertical continuous ovens are well established, especially in mass production or continuous casting foundries. Further progress has been made in dielectric drying.

Shell Mold Process—Potentialities of shell molding have been most widely examined, theoretically and practically. Following the digestive stage, marked progress has been experienced, aided substantially by the enterprise of certain firms who have developed improvements in manufacturing procedure, or by the provision of more reliable synthetic resin binders. The process is being adapted to the production of certain classes of castings previously identified as suitable for precision casts. Furthermore, larger castings than can be made by the precision investment process can be produced with comparable surface finishes.

Mold pouring station at foundry for casting track accessories is hooded to exhaust smoke and fumes

Precision Castings—Usefulness of the precision process for producing castings to fine dimensional limits has been established for small components of intricate design, or where the hardness of the alloy makes machining difficult, especially for small alloy steel castings. Much research has been carried out into the properties of mold materials. Output of precision castings has increased 10,000-fold since the war.

Refractories—The most outstanding developments registered in sands stems from the increased use of mechanical plant which calls for constancy in supplies and has resulted in the use of greater quantities of synthetic materials; the use of synthetic resin-bonded sands and studies into the mechanism of penetration of mold materials by molten steel.

Mechanization—Especially since the war there has been a comparatively heavy swing in a large number of foundries to the mechanization of various operations. The latest improved equipment has been used.

Education—Education and training for industry is being provided for in increasing measure. Craft training is provided by many foundries. Certain technical colleges and schools have increased the facilities for gaining the London City and Guilds Institute Certificate voted by the Institute of British Foundrymen, and also for the National Certificates in Metallurgy. A National Craft Training Centre has been established at West Bromwich and is well supported. Needs of higher level managerial education are aided by facilities of the National Foundry College. Special foremen's conferences are provided by the Institute of British Foundrymen and the British Cast Iron Research Association on foundry technology. Conferences usually are held in the Ashorne district of Leamington Spa. They are very popular.

Controls—Considerable advance has been made in various well-known manufacturing controls. Thus managerial controls, production controls, material controls and methods controls are now more openly practiced in most foundries.

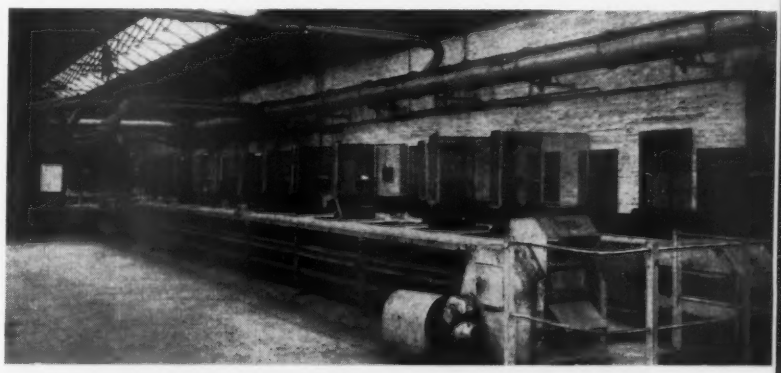
Working Conditions — Improvements in foundry working conditions have been marked. The advisory recommendations put forward to the industry by the government sponsored "Garret Report on Foundry Conditions" largely has been anticipated by voluntary action on the part of the foundry industry, especially by the steel founders. Dust and smoke suppression and washing and other amenities now are fairly general.

Productivity—Influence of the visits of the foundry productivity teams to USA foundries has been most marked in respect to employer-labor relationships and certain production methods. The action spirit generated by the reports of the teams is not being allowed to lapse. Productivity committees have been formed and conferences are continuing and appropriate steps are taken to acquaint both the leaders of the labor unions and industry of the urgency surrounding the problems of production and productivity.

Statistics—Statistical examination of the industry is a little difficult. A comparison of production (not productivity) in 1952, using 1938 as a base index of 100 is approximately as follows:

Gray iron and malleable iron	115
Cast steel (all qualities)	195
Nonferrous (copper base)	110
Light alloys	750

Future Trends—All of the developments referred to in the foregoing notes will receive increasing attention in the immediate future. But the greatest efforts will be in the firm establishment of the discoveries and techniques now visible.



Modern dust control system is employed in British Railways' foundry. This is part of cleaning room

FRANCE

DURING the International Foundry Congress in Paris, foundrymen from all parts of the world will have an opportunity to visit the central laboratory of the French foundry industry on the hill of Sevres, in the outskirts of Paris. This laboratory, completed only a short time ago, is considered one of the most modern in the world to serve the foundry industry. Its facilities were described in FOUNDRY, December, 1952.

In France, as in every nation having a progressive industry, can be found the most recent foundry technical developments. Certain branches even boast that they take first place, internationally, in their own specialty as, for instance, in the field of hydraulic castings.

One of the most characteristic traits of the French foundry industry is the part it has played in developing co-operative effort. Such co-operation is the logical outcome of the varied and dispersed structure of the industry. There are in France no less than 2000 foundries employing some 100,000 operatives and, apart from a small number of large undertakings, a vast majority consists of small and medium size foundries. The necessity for grouping all efforts was all the more marked as a result of the occupation from 1940 to 1944, when, owing to destruction, the taking away of plant, and equipment, the shortages of raw materials and the dispersion of workers, output fell to a level well below that of the immediate prewar years.

Despite these disasters, French founders rapidly recovered after the liberation. By the year 1948 output equaled, and soon outstripped the production of 1938, which is estimated at just under 1,500,000 tons of castings of all descriptions.

Present efforts being maintained, it is estimated that the potential of technical expansion thus realized would, given a favorable economic orientation, bring about in the next 10 years a substantial increase of production, without increasing manpower. Recently, the French foundry industry has started a large scale experiment of productivity in a number of pilot foundries. The aim is to determine the possibilities of expanded output, and the best methods to achieve this end, taking into account the specific conditions relative to the nation's industrial activity.

A number of significant developments in the technical field indicate progress realized in recent years.

Renewal of plant and equipment and modernization of layout and organization have been effected. Several hundred foundries have been mechanized or have improved existing methods of mechanization. Molding stations have been reorganized with addition of modern handling equipment, automatic sand preparation plant has been installed, and cupolas have been provided with means of automatic charging. In regard to the plant itself, modern conceptions have been applied to the construction of cupolas and drying ovens. In nonferrous foundries, and even in some iron foundries, there has been an increase of the use of electric furnaces, despite the high cost of electric power in France.

Thanks to close co-operation between suppliers and users, the quality of raw materials has been improved. As an instance, the manufacturers of core binders and of blackings supply their products covered by a quality label, the specifications having been agreed between manufacturers and founders. Regular contacts are also established with the coal and coke industry and with the producers of foundry iron in order to co-ordinate the efforts of these industries and the foundries.

Quality of castings is being controlled more closely. For those foundries not equipped with a laboratory, ten co-operative laboratories are dispersed over the country and are functioning at a 100 per cent rate, their activities having increased fivefold in the past five years. An increasing number of foundries are setting up means of testing and control, ranging from test pieces to the use of gamma-ray inspection.

Develop Quality Specifications

Quality specifications gradually are being developed through the Bureau of Foundry Standardization. Already about 30 specifications for quality of castings have been adopted, while a further hundred are being investigated. In certain cases labels or quality markings are stamped on the casting. Manufacturers of ranges and heating equipment who are linked with the foundry industry since 1945 thus have increased the efficiency of their products from 40 per cent prior to the war to 70 and 80 per cent at the present time.

Concurrently with these various improvements, progress has been achieved in methods of molding and the elaboration or preparation of metals and alloys for casting—either by private enterprise or by co-operative means. In the latter case about 300 technicians co-operate in the work of some 30 committees. Among subjects under present investigation are: 1—Influence of gases on the structure of alloys. 2—Modulus of elasticity and damping characteristics of cast irons. 3—Characteristics of steels used for the manufacture of dies for die casting. In this respect it is to be noted that, in France as elsewhere, a large increase has taken place in the tonnage of castings made by die casting or pressure casting; since the end of the war the tonnage of pressure die castings has doubled, and it is now six times the prewar tonnage. 4—Use of the basic lined cupola. 5—Spectrographic control of enamels. 6—Investigation of the wear of ingot molds.

Among researches recently completed are: In-

fluence of boron and chromium on malleable iron; elimination of aluminum in tin bronzes, with the object of remelting of scrap; use of drying ovens with recuperation of heat. The results of this co-operative research are made available to the industry through lectures, reports and printed booklets. Recently published were: *Practical Guide for the Designing of Cast Steel Parts;* a second work is ready, covering *Cast Iron Parts. Nondestructive Tests* is the subject of another publication. Mention should also be made of the *Album of Foundry Defects,* published in France under patronage of the International Committee of Foundry Technical Associations.

The French foundry industry has played a considerable part in the formation and training of foundry operatives, foremen and managers. The French Foundry school founded in 1923, is being provided with new buildings which will be built and equipped during 1953 and 1954.

By these various means, the French foundry industry in endeavoring to achieve a higher quality of its products at a lower price, is aiming at improving the standard of living and dispensing greater happiness. Despite present day economic difficulties the industry is persevering in its efforts.

French founders have the support of a solid professional organization, comprised mainly of the powerful Syndicat General des Fondeurs de France with its local branches; the industrial technical center which directs and supervises the work of the 300 technicians already mentioned and is responsible for the operation of the main laboratory at Sevres and the ten local laboratories; the Bureau of Standardization; a documentary service—and, last but not least, the Association Technique de Fonderie which, in addition to its annual convention and local meetings, brings together not only its own members, but also assures a close contact with similar associations and societies of other nations.

Die casting machine in light alloy foundry near Paris. Electric melting furnaces are employed

BELGIUM

IN COMPARISON with the United States, Belgium is a small country. Its total area could be enclosed in a triangle formed by Washington, Pittsburgh and Philadelphia, and its whole population could be housed in the city of New York. Yet, this small nation occupies a considerable place in world economy, thanks to the hard working qualities and the perseverance of its people.

Since prehistoric times, metals have been extracted from their ores and have been processed on Belgian soil, as evidenced by the existing remnants of furnaces and forges, and this industry has been constantly sustained and has grown to the present time. Many technical and mechanical developments have originated in Belgium. The Belgian foundry industry has played a great part in this evolution and has contributed materially to modern developments.

Within the country's limited area, there are 466 foundries making castings in gray iron, steel and nonferrous metals. Barely 20 of these employ more than 200 workers; the others are made up of small undertakings, which are characteristic of the foundry industry of the country.

With the passage of years, the economic conditions of the industry have gone through considerable changes, due to exhaustion of ore mines in Belgium, and to the introduction of coke and electricity in metallurgical processes. The only national raw materials today are coke of high price and irregular quality, and foundry sand of the finest grades and of great variety. All other materials must be imported. As Belgium depends largely on its export trade, cost of raw foundry materials must be counter-balanced by intelligent and efficient work on the part of its operatives and management.

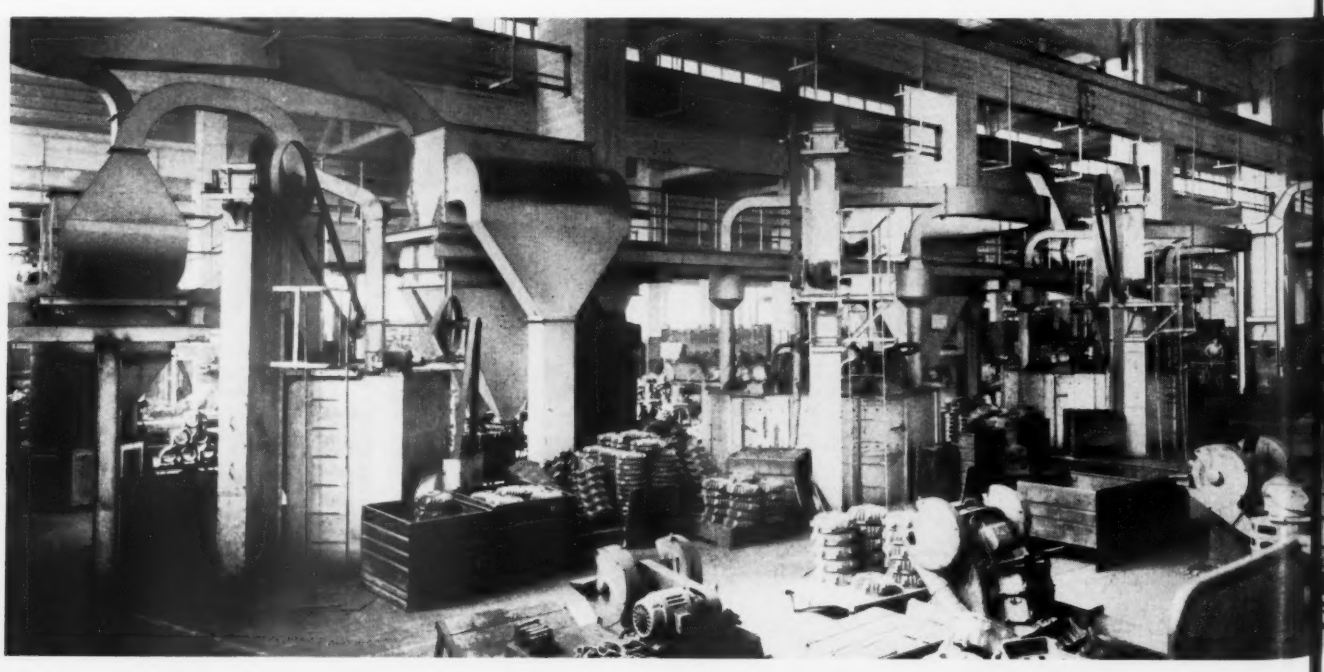
This is all the more necessary in order to maintain the high standard of living prevalent in Belgium, meet highly competitive conditions, and overcome the various obstacles, such as tariffs and currency restrictions now prevailing in the world of trade. As to the average Belgian worker, psychologically he is individualistic, obstinate, realistic, willful and a lover of freedom. These characteristics render it difficult for him to accept collective discipline.

Such are the conditions under which the Belgian foundry industry has to work. The necessity to keep down production costs is met in two ways: (a) by professional organization, through scientific research, economic study and technical research, and (b) probably the most important factor, by technical improvements brought into actual works practice.

Scientific foundry research is carried out at the Gand (Ghent) center, where important studies have been made in recent years on nodular iron. On the economic and social plane, the organization known as "Fabrimetal" comprises most of the metalworking industries and includes a foundry group. This body also promotes and co-ordinates the activities of various technical committees.

The Association Technique de Fonderie de Belgique plays a large part in the progress of the foundry

View of cleaning room at Ateliers de Constructions Electriques de Charleroi, a modern Belgian foundry



A SPECIAL REPORT

By J. F. GOFFART
President
Technical Association of
Foundries of Belgium

industry. Its aims are similar to those of the American Foundrymen's Society in its endeavors to improve the technical and technological knowledge of its members, and to promote co-operation, not only on the national scale, but also with founders from other nations.

All these collective activities find their necessary application in the foundries themselves and, as a result, several Belgian foundries have achieved results which place them on a par with the best practice in any other country, as evidenced by the following few examples:

A certain steel foundry has, in a few short years, completely modernized its plant and equipment, and also its methods of production and control and its general organization.

The transformation started with the mechanization of the principal departments of the foundry. In connection with the melting shop, the stockyard for scrap has been covered to avoid contamination of molten steel by hydrogren arising from the dissociation of water accumulating on the scrap. Handling of the charges to the modern electric furnaces with suspended roofs is by electro-magnets. More than 200 grades of special steels are obtained in the induction furnace.

Preparation of molding and facing sands is entirely automatic, from the shakeout stage to the filling of the hoppers above the molding machines. The equipment comprises mechanical shakeout; magnetic separators; mixers of the American type, or of the German spiral gear type; belt conveying or by fork lifts, and continuous control of the characteristics of the sands.

Molding is by sandslingers and modern molding machines; drying of molds is accomplished in ovens with superheated steam circulation. Cores are dried in continuous ovens controlled by photoelectric cell.

This firm is imbued with the essential importance of production control, not only to increase output, but also to achieve the best method of molding through nondestructive tests of the castings.

These advances have enabled the firm to combat effectively competition from welded fabrication.

Another steel foundry, which specializes in large castings, has progressed greatly by acquiring increased knowledge of the laws of solidification and using an improved method of desulphurization, dephosphorization, deoxidation and degassing, by using highly reactive slags. The same company has improved the productivity of its iron foundry greatly by a systematic study of methods and times; in certain cases productivity has more than doubled.

Roll Problems Are Solved

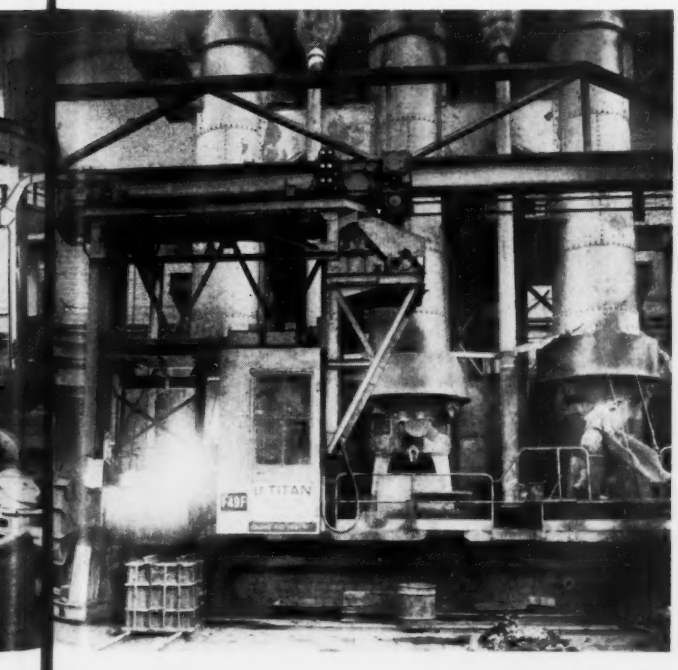
Roll founders have solved, with American collaboration, the difficult problems set by new specifications for rolls used in four high stands for plates, and for continuous mills for steel sheets and strip. They also have taken advantage of the availability of ductile irons and of the latest techniques, such as are used, for instance, for compound rolls.

Repetition work in the foundry has gained considerably in Belgium through the wise use of mechanization, which solves economically most problems of handling. One foundry has equipped itself, on the American pattern, with a well designed conveying layout, coreblowing machines, high frequency dielectric drying, skip and electromagnetic charging in the melting shop, continuous pouring, ladle additions and the use of synthetic sands.

The practice in high duty gray iron has not lagged behind and metallurgical improvements have resulted in obtaining well differentiated grades of iron answering to increasingly strict specifications. Progress also has been achieved in the making of light castings. One foundry has installed a completely automatic sand preparing plant, continuous molding and pouring stations, mechanized handling, continuous enameling ovens, etc.

Thus, in many instances, covering a varied field of casting, Belgian foundries have kept abreast of the latest advances.

Cupola melting department pours continuously



ITALY

IRON foundries in Italy are facing particularly difficult conditions. The reasons are twofold: First, lack of certain basic raw materials, namely iron and coal, and second, the structure of the Italian industry which does not allow real mass production, except in some cases.

As a matter of fact, of something over 900 iron foundries operating in Italy, about 20 plants can be considered as really important and in position to operate on a highly mechanized level for mass production. About 80 foundries are of medium capacity, and are mechanized, or in condition to be mechanized. Modern production systems have been adopted or are about to be introduced in another 200 plants. The remaining iron foundries can be considered as artisan enterprises or small size plants which, however, are trying to improve installations and output within the limits of the organizations' possibilities. Twelve foundries produce white and black heart malleable.

Managements of most foundries feel the necessity of putting their plants in line with modern technical developments. The only reason why many plants have not yet started such an improvement program is the prevailing uncertain market situation, and the very restricted economical possibilities.

A 1952 survey of castings production in Italy gives a figure of 500,000 tons, employing labor of 36,000 man power units. The man-hour production, which was 10.7 lb in 1949, has increased to 14.3 lb per man hour in 1952. The average man hour output of Italian foundries thus has reached the average production figure obtained by Western European foundries. This production index clearly indicates the improvements that have been undertaken and the good results achieved by proprietors and technicians of the Italian foundry industry, in spite of various difficulties.

During recent years a number of very interesting mechanized plants have been put into operation, this group including a foundry for the production of automobile castings and nonferrous alloy castings, two plants for making sanitary ware castings and household appliances, a plant for producing castings for textile machinery, and another plant for the production of small size malleable castings. All of these foundries are highly modernized and in full production.

Some foundries have undergone a complete transformation and modernization including: One foundry for malleable cast iron, two for bath tubs and sanitary fittings, and one for general mechanical appliances. At present a big, new malleable iron plant is ready to be put into operation, while plans for another similar plant are near realization.

In the territory near the town of Vincenza, the National Production Board, which is under the direct supervision of the presidency of the council, is carrying out new experiments on cast iron foundry production. There are great hopes for obtaining favorable results before the end of 1953, and these results will be the basis for further applications.

The technical level of the Italian foundries is fully up to date in all metallurgical problems. Management is prepared, whenever possible, to apply the most modern principles. In many instances new suggestions for improvement have had international interest.

Some foundries are specialists in Meehanite castings, others in acicular iron, Ni-Resist and Ni-Hard production. As in other parts of the world, the topical problem in Italy is the production of nodular cast iron. Fourteen foundries have secured manufacturing licenses and are operating under most rigorous metallurgical controls, with excellent results. In that field new and interesting ideas by the Italian technical experts also are on the point of materialization.

Another problem which the Italian technicians have had to face is the use of natural gas (methane gas), which is available abundantly in Italy. As soon as pipe lines are laid, foundries are eager in utilizing methane gas for mold and core baking ovens and for drying of ladles. Interesting plans and experiments on the use of natural gas in cupolas are being developed at present.

All progress of casting techniques, and in partic-

A SPECIAL REPORT

By MARIO OLIVO
President
National Association of Foundry Machinery and Equipment Suppliers
President, Impianti Fonderie Olivo
Milan, Italy

ular of cupola technical improvements are followed closely. Many foundries are using electric furnace melting equipment, especially for the production of spheroidal graphite castings.

In Italy only one foundry has specialized in investment casting covering entirely the market requirements. This foundry is extremely well equipped, and its output is highly satisfactory. Shell molding and casting have not been overlooked, but the material application has been delayed on account of present uncertainty regarding the patents. As soon as this point is fully clarified, large scale applications are to be expected.

During 1952 conventions were held at which evidence was given of the trends of the Italian foundry industry. Under the auspices of the MSA, the Mission TA 45-81 composed of a group of United States technicians was in Italy between November, 1951, and April, 1952, visiting many foundries and giving valuable advice and suggestions directly to the foundries as well as indirectly to technicians who were attending the conventions held in various Italian cities. The mission also has worked out a scheme for modernization of Italian foundries which will be published soon.

On the occasion of the International Foundry Congress held in Atlantic City in May, 1952, a group of Italian technicians, members of International Mission III, visited the United States, taking part at the Congress work, and paying visits to numerous foundries. At that meeting a group of technicians belonging to "Centro Fonderia" also took part.

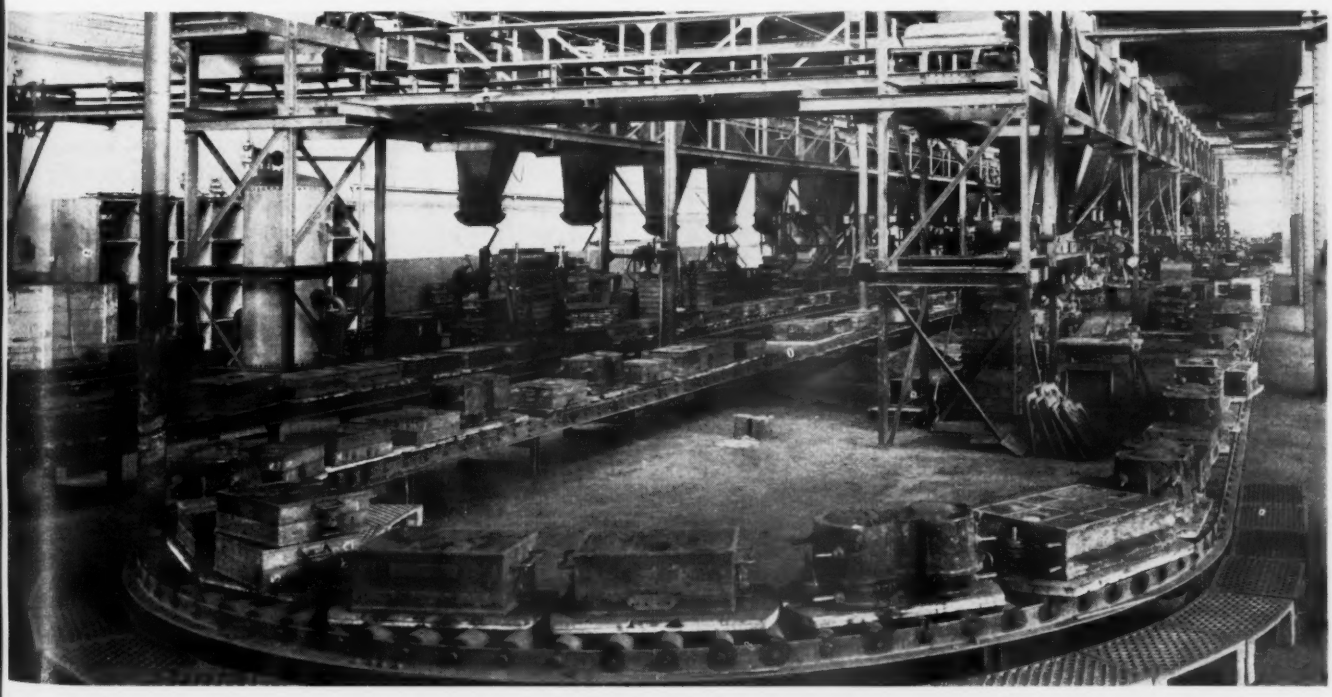
All Italian technicians recall the warm welcome they received in the United States and the tributes paid to the memory of the late Dr. Ing. Guido Vanzetti.

In November, 1952, Italy officially attended the First European Foundry Productivity Meeting in Paris, where interesting reports were presented by the Italian delegates. The Italian technicians took part in the discussion during the meeting and visited pilot foundry installations.

It has been announced that a group from the United States, participating at the International Foundry Congress in Paris during September, 1953, will take that opportunity to tour Italy. This program will be of utmost interest, because, being present on the spot, these delegates can realize much better the achievements and the remarkable progress made by the Italian foundry industry.

Italian technicians will be happy to reciprocate all the courtesies shown to them by the American colleagues, and to demonstrate the high desire for closer co-operation.

Two views of the mechanized molding line at the A. Necchi & A. Campiglio Foundry, Pavia, Italy



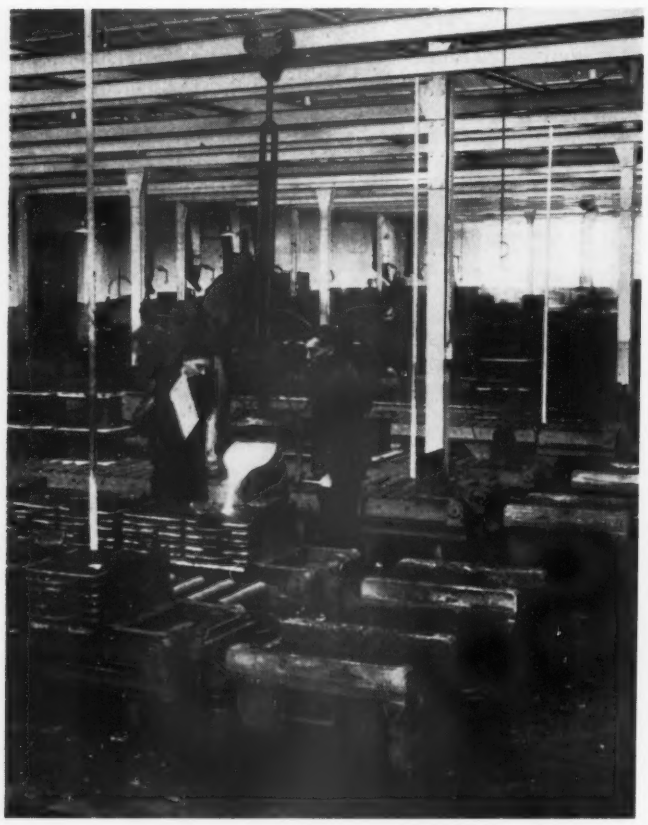
NETHERLANDS

NETHERLANDS foundries are quite divergent in type and industry served. Some are connected with industrial manufacturing concerns including shipyards. Others are jobbing shops, generally leaning toward specialization, such as building supplies, municipal castings, stoves and household necessities.

Requirements of the Netherlands for foundry products before World War II is estimated at 160,000 tons a year. Production then was approximately 105,000 tons, so that 55,000 tons had to be imported. Sixty per cent of the total was destined for the engineering and shipbuilding industries, 15 per cent for household use, 5 per cent for electro technical purposes, 5 per cent for the railways and 15 per cent for various uses.

The Netherlands has 98 iron foundries which, in the year 1951, produced approximately 196,000 tons of foundry products. This together with roughly 8000 tons of steel foundry products makes a total of approximately 204,000 tons of iron and steel foundry products. Foundries are looking to export possibilities as a means of increasing demands.

Production of iron foundries in the Netherlands is as follows: 1938—102,000 tons; 1946—83,000 tons; 1947—109,000 tons; 1948—133,000 tons; 1949—149,000 tons; 1950—173,000 tons; 1951—196,000 tons, or a gain of 94,000 tons since 1938.



Pouring molds on roller conveyor at a Dutch foundry

Some impression of the size of these foundries is given in the following table covering the production of 85 foundries during a recent year (13 foundries are missing): 8 foundries produced more than 4000 tons each; 23 foundries produced between 1000 and 4000 tons; 15 foundries produced between 500 and 1000 tons; 26 foundries produced between 200 and 500 tons; 13 foundries produced less than 200 tons.

In this table the sand spun pipe foundry of the Royal Dutch Blast Furnace & Steel Works at Ymuiden is not included. Had this been the case then the first line would have read: 9 foundries produced more than 4000 tons each.

Without the sand spun pipe foundry the monthly production per workman as an average of all 85 foundries is figured at 1.23 tons, with the pipe foundry included, this would be 1.48 tons. Production in tons per man per month ranged for 2.52 for the larger foundries to 0.65 tons for the smaller. The nonferrous foundries produce many types of castings.

Nonferrous Industry Is Smaller

There are about 150 nonferrous foundries which can be listed as follows: 15 shops produce over 200 tons each per year, with a total of 1500 workers; 10 shops produce from 100 to 200 tons each, with a total of 300 workers; 125 shops produce under 100 tons per year, with a total of 1500 workers.

Total yearly production of 13,000 tons is split up into 8000 tons of copper and copper-base alloys, 1250 tons of aluminum and aluminum alloys, 600 tons of zinc and zinc alloys and approximately 500 tons of various metals such as lead, magnesium, nickel, tin and alloys of these metals; in addition to 2650 tons of diverse metals and alloys.

Besides centrifugal castings made in metal molds, permanent mold castings, die castings and sand castings are being made. The raw materials smelted in our country are scrap and tin. For ingots of standardized quality and analysis the foundries depend mostly on foreign countries.

The labor problem is of particular importance to Netherlands foundries. As in other countries we, too, are endeavoring to improve the number and the skill of workers and superintendents by improving social conditions and by training and retraining. Shortage of trained workmen is still a serious handicap for the further development of our foundry industry.

Through standardization and specialization, through limited mechanization of the smaller and extensive mechanization of the larger foundries, by research work on the whole technical and economic field of the foundries, the Dutch foundry industry must find her rightful place at home and, we hope, abroad as well.

By F. W. E. SPIES
President
erlands Technical Foundry Association

A SPECIAL REPORT

General view of the pipe foundry at Royal Netherlands Blast Furnaces & Steelworks Ltd.

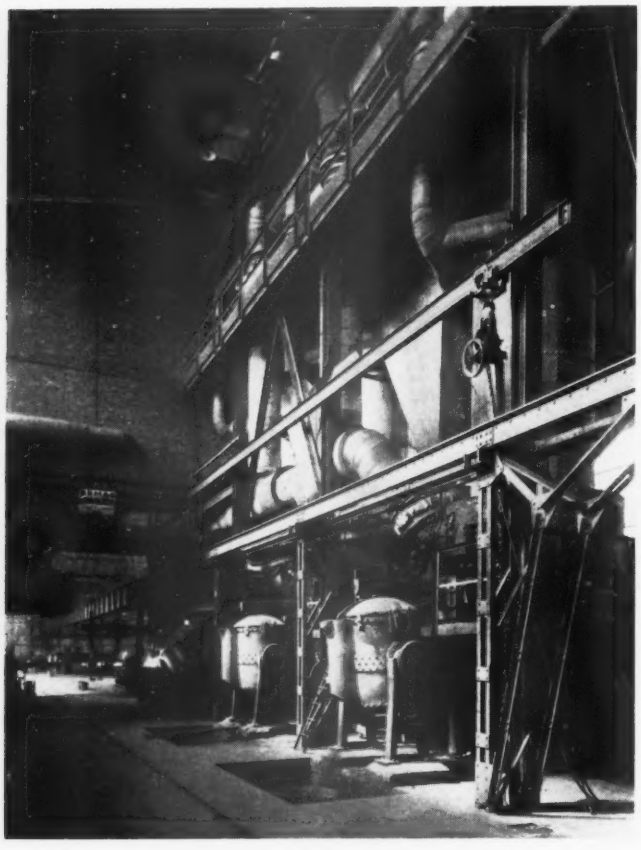
Line of molding machines operated at one of the larger Dutch foundries. The country has 98 iron foundries and about 160 nonferrous shops

Raw materials stockyard and charging bridge at Royal Netherlands plant

GERMANY

LAST year the author, together with 20 German foundry technicians, took part in a study tour in the United States in connection with the OEEC program. In the course of this, the German team visited more than 80 foundries. Drawing on his impressions of the technical standards of American foundries, the author believes it might be of interest to American foundrymen to hear about developments in German foundry techniques.

The West German Republic does not have large foundries like the USA and only a few foundries employ more than 800 men. The average number of workers in iron foundries is about 200 men. There are even fewer in nonferrous foundries due to the handcraft character of these plants. The difference in size of the ferrous foundry industry is indicated by the following approximate statistics on average production during 1951: U.S.A., 18,124,000 short tons; Europe, 10,320,000 tons; West German Republic, 2,764,000 tons.



The three cupolas in this modern German foundry are equipped with tilting forehearths and two recuperators. Foundry capacity is 10 tons per hour

About 155,000 are employed in approximately 1150 iron foundries and some 25,000 in 1100 nonferrous foundries. The entire German foundry industry employs 180,000 persons and that number is increased slightly.

The German foundry industry which suffered greatly from the war destruction and had heavy economic losses due to the lack of raw iron, scrap iron, metal and coke, tried, during the reconstruction years, to obtain through foundry improvements the increase capacity needed to meet the general increase in costs. These improvements included integration in every possible way, improvement in quality, enlargement of the market for cast materials, and new and improved casting procedures.

In view of the fact that the worker is the most important factor in obtaining maximum capacity by advantageous use of existing equipment, there were and still are continuous courses of instruction lasting several weeks. These are sponsored by the Verein Deutscher Giessereifachleute (German Foundrymen's Association) throughout the nation. There are two kinds of classes: 1. Training of specialists to conduct precise studies of work methods, 2. Training of foremen with the aim of establishing a human link between the scientifically-trained engineer and the worker.

The entire West German Republic follows the same schedule in these two courses. Classes have no more than about 20 members who must show good aptitude and pass a special test for admittance. Successful participation in these courses is confirmed by a certificate recognized by authorities.

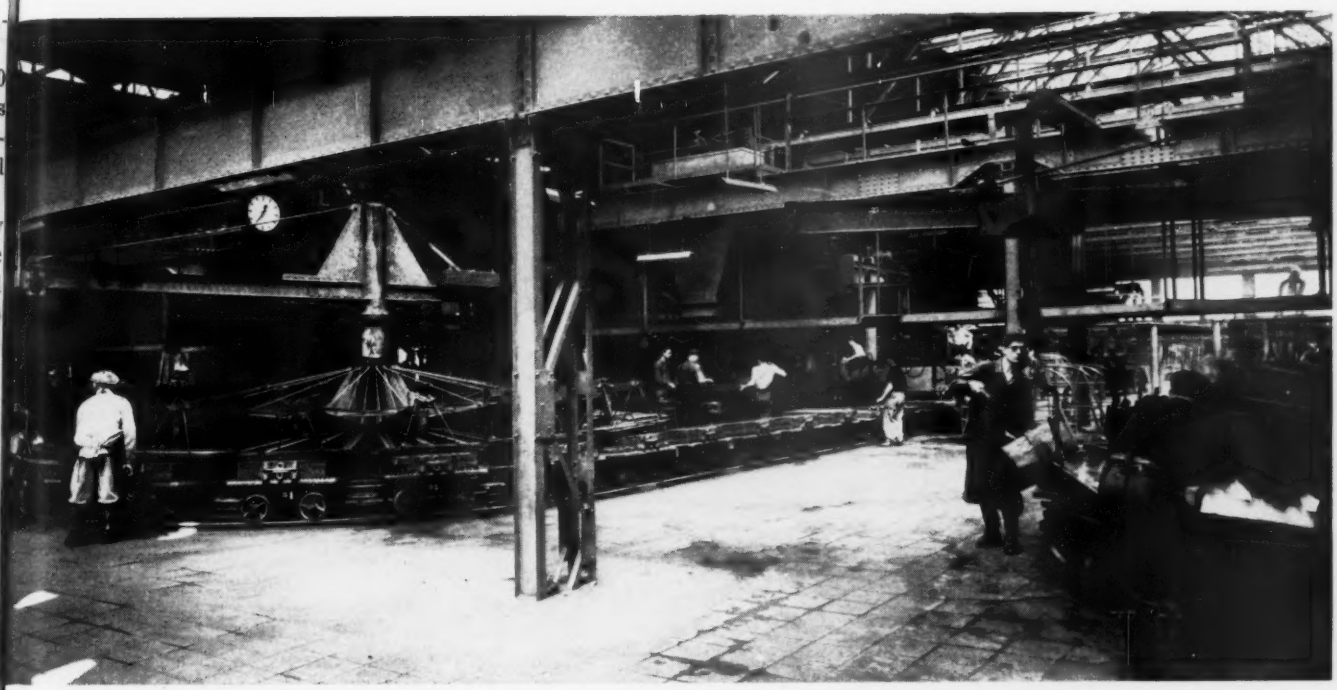
Attempt To Increase Production

Efforts to increase production with good profits and just wages through integration are embodied in Germany in the collective term REFA. This is an abbreviation and because of its 30 years of existence as an established entity it was carried over from the prewar years. It means State Committee for Work Studies (Reichsausschuss fur Arbeitsstudien.) Specialists, called REFA men, who have been trained in these courses, are in great demand by foundries. Their field of activity consists of work and time study, determination of terms of performance, planning best design of working area, avoiding lost time and preparing the work schedule and advance production calculations.

The scientific, modern advances in foundry techniques learned by the engineer during his studies in technical colleges and technical schools and constant-

A SPECIAL REPORT

By DR. E. HUGO
Secretary, German Foundrymen's Association and Editor, Giesserei



Partial view of seven molding lines at Ironworks Hilden A. G. Turntable at left handles pouring weights. Each line has two molding machines and crew of 11, including pourers and shakeout men

ly amplified by reading scientific books and magazines, must be applied in practice as quickly as possible. This is done more easily when foremen, who lack the advantages of technical education, are familiar with the terms of speech used by engineers. The courses in physics, chemistry, metallurgy, foundry techniques, reading of drawings, etc. are based on actual examples of foundry practice. Classes are so conducted that the layman unschooled in theory can understand. Foremen trained in this way who, for example, are able to calculate the mixture from the given type of wall thickness wanted and the available type of raw iron, are very much in demand.

In Germany, the following technical procedures, which greatly helped in economy and improved quality, stand in the forefront: Use of hot blast cupola furnaces, particularly in connection with the production of cast iron with spheroidal graphite (nodular iron); application of synthetic molding sands; increasing use of modern core blowing machines; and the reduction of transportation expenses in foundries by practical mechanization.

The hot blast cupolas in use operate under different systems of drawing off gas and preheating the blast, where blast is mostly preheated to over 400°C. It is an interesting fact that in 1948 Germany had only two or three hot blast cupolas in operation, while now more than 80 are in operation or being constructed. A similar quick development is found in the introduction of synthetic molding sand which has been in use for a long time in America. In spite of the numerous and abundant natural molding sands, approximately 30 per cent of German foundries now use synthetic mixtures of quartz sand and bentonite to provide uniformity of the molding sand. The German Foundrymen's Association was of great help in the rapid introduction of this useful procedure in Germany through enlightening speeches and lectures at many meetings and in numerous publications.

Advanced German foundries are doing much development work in the field of centrifugal casting, pressure die casting and precision casting. For example, the inventor of shell molding, Mr. Croning, is a German.

Scientific research and development is effectively supported by the industry through the expansion of existing institutes, for example the Giesserei Institut (Foundry Institute) at the Technical College Aachen and the planned construction of an institute for foundry techniques at Dusseldorf.

SWITZERLAND

SWITZERLAND, although small, is essentially a highly industrialized country having 70 gray iron, four steel, two malleable iron as well as a number of nonferrous foundries. Production of the iron foundries, in which about 11,000 workers are occupied, is estimated at approximately 160,000 tons a year. These iron foundries depend on foreign countries for the import of raw materials. All coke, a large part of the pig iron, alloy metals, a certain proportion of core and molding sands, and some scrap have to be procured from abroad.

Swiss iron foundries work principally for domestic use. Manufacturing programs have to be vast and comprehensive to cope with the varied requirements of the home trade, in particular the machine industry and its export branches.

On the other hand mass production in Switzerland is practically unknown. Costs of cast products include a high rate for wages. Judging from a European standard, wages in Switzerland are very high. This makes it necessary to attach great importance to productivity. On the other hand the machinery industry demands very high quality iron castings to meet competition on the world market.

In consequence Swiss foundries must be constantly on the outlook for the most up to date methods for mechanizing the plants. In view of limited sales possibilities only a few fully mechanized foundries exist. The greater part of the iron foundries are medium sized firms equipped for economic production of small runs of castings.

Since the end of World War II, a number of foundries have been established working on rationalized methods, great importance being laid on the development of molding machines and sand handling installations. The level of the working capacity has been successively and continuously improved. Thanks to this all round improvement Swiss foundries are able to comply with the very exacting demands of the machine industry in respect to quality.

An example for the economic equipment of a modernized foundry in a textile machine factory can be found in the accompanying illustration of a coremaking department. In this department cores for a monthly output of 500 tons are produced by eight coremakers with core blowers. Another illustration shows a modern cleaning shop. The cleaning machines are not visible and are erected at the head of the shop. The cleaning machines are fitted with single dust suction parts and the ceiling is covered with sound absorbing plates.

Increased productivity and reorganization in a completely new foundry in Zurich also are illustrated.

From a technical standpoint, it might be said that some firms have made great progress in respect to alloyed iron castings. It is necessary to control the rate of cooling much more accurately for machine tool castings than for ordinary gray iron castings. This requires a highly skilled melting technique. The necessary accuracy of ± 0.05 per cent of the carbon and silicon content is obtained by feeding the iron into a second furnace.

The process of production of spheroidal cast iron has been improved to obtain higher values for the

Part of the coreroom of a modernized foundry operated by a Swiss textile machinery manufacturer

notch toughness and greater strength. This has been made possible by a very low silicon content.

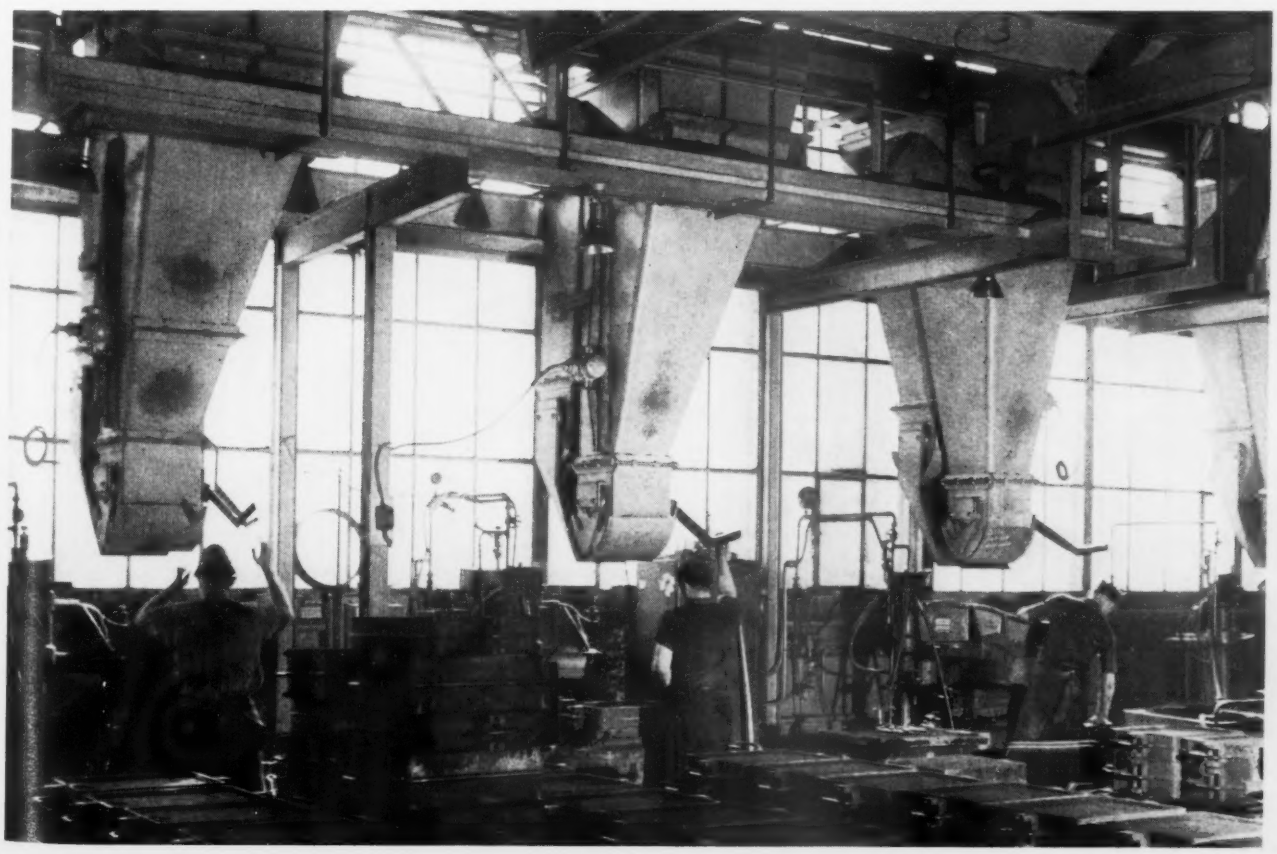
In another foundry with an annual output of about 20,000 tons, the spheroidal cast iron also has become an important product. This firm has developed machine molding considerably and casts iron in pieces up to 50 tons each. It has, like various other foundries, up to date research and testing laboratories. A special method has been introduced by the same firm for the manufacture of piston rings, camshafts and crankshafts out of alloy gray iron for automobile works.

In the steel foundries castings are produced that weigh up to 25 tons each. Metal for all the steel castings is melted in electric arc furnaces or in medium frequency electric induction furnaces. A specialty of the Swiss steel foundries is hydraulic casting and pelton and francis wheels.

An outstanding innovation is the precision casting which is produced by the lost wax process.

Above—Ceiling of this foundry cleaning room is covered with a special material to absorb sound

Below—Showing some of the molding stations at the jobbing foundry of Escher Wyss Ltd., Zurich



Paris Is Host to INTERNATIONAL FOUNDR

WORLD-WIDE interest of the foundry industry will be centered on Paris the week of Sept. 21 where the International Foundry Congress is to be held under the sponsorship of the French foundry technical association—Association Technique de Fonderie. An extensive program of technical sessions and visits to plants in the Paris area is scheduled for the week.

Approximately 125 delegates from the United States are expected to attend the Congress. The majority of them will sail from New York Sept. 9. Heading the group will be L. N. Shannon, vice president, Stockham Valves & Fittings Inc., Birmingham, who was elected president of the International Committee of Foundry Technical Associations at the 1952 International Congress in Atlantic City. Representatives of the American Foundrymen's Society at Paris will include Collins L. Carter, national president, I. R. Wagner, immediate past president, William W. Maloney, secretary-treasurer and several directors of the society.

Mr. Shannon will speak at the opening session of the Congress to be held in the amphitheater of the Sorbonne at Paris University, Monday morning, Sept. 21. He will also preside at the annual meeting of the International Committee on Sept. 24. Vice president of the International Committee, and slated to succeed Mr. Shannon as president in 1954, is Achille Brizon. Mr. Brizon, managing director of Societe "Fonderie A. Brizon," Courbevoie, Seine, France, headed the French productivity team for pressure die castings which visited the United States a year ago.

Paul Muguet, president of the Association Technique de Fonderie, will be chairman of the Paris Congress. He is a member of the general management staff of Societe de Commentry-Fourchambault et Decazeville, Paris. Co-operating with the French association in arrangements for the Congress, particularly in connection with the technical sessions, is the Tech-

Headquarters for the International Foundry Congress will be located at the Association Technique de Fonderie building, 2 rue de Bassano, Paris

ORCONGRESS

PAUL MUGUET
President
Association Technique de Fonderie
Chairman, International Foundry Congress

L. N. SHANNON
President
International Committee of
Foundry Technical Associations

ACHILLE BRIZON
Vice President
International Committee of
Foundry Technical Associations

nical Center of the Foundry Industries, headed by Pierre Ricard, president, and Auguste le Thomas its director.

Technical Program—Headquarters for the Congress will be at the Association Technique's building, 2 rue de Bassano, where most of the technical sessions also will be held. The technical program will comprise more than 50 papers to be presented over six days. It will start Monday afternoon with sessions on the subjects of gases in metals, risering of malleable castings, and cast irons.

Tuesday's session will be devoted to technical training "from apprenticeship to the upper grades." This will include an exhibition, films and lectures.

Plant visits are scheduled for Wednesday morning, with afternoon sessions given over to discussion of graphite in cast iron, refractories used in foundry furnaces, and foundry defects.

Thursday's program includes morning plant visits and afternoon sessions on spheroidal graphite cast iron, questions connected with laboratories and chemical problems, and testing methods for castings.

Friday morning's sessions will cover cast iron (melting, enameling, alloyed cast irons), molding and coremaking, and time and labor saving in the foundry. A visit to the Technical Center will be conducted in the afternoon.

Subjects for Saturday morning's session include safety and hygiene, light alloys and copper-base alloys, and nondestructive tests.

Formal closing of the Congress Saturday afternoon at the Sorbonnne will be the occasion for the presentation of the International Committee's Award of Honor. This award, a bronze replica of Cellini's Perseus, was instituted in 1951 by Comm. Mario Olivo of Italy. At the Committee's meeting in Atlantic City last year the French association was formally invited to submit the name of a recipient for the 1953 award. Its selection will not be announced until the award is made.

In addition to visits to nearby plants during the Congress, inspection of other French foundries will be included in the itinerary of motor coach tours to various sections of France the following week. These tours are being arranged for visitors by the French association.

PLASTIC PATTERNS Offer Advantages in INVESTMENT CASTING

Plastic patterns can be made economically, eliminate hand work, decrease the number of patterns lost during dip coat and investing operations and aid the production of sharply detailed castings that have excellent as-cast finishes

By ROLAND S. BANISTER
Manager
Investment Casting Div., Midwest Foundry Co.
Coldwater, Mich.

ALTHOUGH the investment casting process is 2000 years old and has long been used by dental technicians and jewelers for making inlays and fine jewelry, most of its applications in the industrial field are relatively new. The list is growing, however, and the possibilities for future expansion are unlimited.

The dental and jewelry trades produced castings that weighed only a fraction of an ounce each and used metals and alloys that presented no severe melting problems. Nevertheless, the fundamental idea was sound and the method was adaptable to larger scale production and to much larger castings. Certainly the intricacy, precision and accuracy obtained by those trades demonstrated the possibility of developing the method to greater production.

Within the last ten years the process has been recognized as being essential to piece-part manufacture as forgings and sand castings. Until several years ago, excessive cost limited most parts produced by this process to intricately shaped castings in alloys too hard to machine or form in any other manner. More recently, however, great strides have been made in introducing newer and faster methods of performing the many operations essential to the process. Continued progress can make the process substantially competitive with existing methods of manufacture of many types of parts.

Possibilities of the process arise from its ability in most instances to hold dimensions within very close tolerances with as-cast surface finishes well under 100 R.M.S. Almost all alloys can be cast including silicon bronzes, beryllium copper and stainless, heat-resistant and tungsten tool steels. Among the most important current applications of the process are the production of jet engine turbines, compressor and nozzle blades, gun parts, intricate and complex tank parts, sewing machine components and a multitude of other parts for industrial machinery and equipment.

Until recent years, war and defense needs restricted activities largely to high-temperature alloys, and only a small amount of work was done with the more common grades of low-alloy steels. Recently, however, the method has been developed so that castings weighing 50 lb or more can be investment cast successfully, and the handling of low-alloy steels has been promoted extensively.

Pattern Is Critical Item—Because the expendable pattern is the first and most expensive step in producing a casting, most foundries have concentrated on

Fig. 1—This pattern illustrates the savings that use of plastic offers. Produced in wax, it cost about 75 cents for material alone. Now it is purchased from a plastic molder for under 30 cents

Fig. 2—Plastic material simplifies the assembly of patterns, gates and risers and joining of patterns. Smooth, strong joints eliminate hand work

improving this operation. A great deal has been accomplished. At the Midwest Foundry Co., our approach to the pattern problem on long-run production jobs, where additional tooling cost will be justified, is to consult a commercial plastic injection molder and to contract for the production of the patterns.

This practice eliminates several production problems, cuts down on equipment expenditures and floor space requirements, and provides an expendable pattern far more economically than we can produce it in our own plant. Injection molding is a highly specialized operation that should be entrusted to a reputable molder who has the proper equipment, engineers and experience for the job. This practice also eliminates the formidable problem of pattern shrinkage. A good molder assumes the responsibility of designing tools and molds to produce patterns to specified dimensions and limits.

Reviewing the advantages as well as the disadvantages of using plastic instead of wax patterns, we have found the following to be generally evident:

The initial raw material cost of plastic is far below that of good pattern wax. Whereas plastic currently costs about 35 cents per pound, good pattern wax costs over 90 cents. When the pattern shown in Fig. 1 was produced in wax, it had a material cost (less labor) of about 75 cents. It now is purchased from a plastic molder for less than 30 cents.

For assembling patterns, gates and risers and for joining patterns (Fig. 2), plastic is far superior to wax. The smoother, stronger joints obtainable eliminate hand work and decrease the number of patterns lost during the dip coat and investing operations.

In addition, plastic patterns are exceedingly smooth and dimensionally accurate. Since neither of these characteristics is affected by handling, they are imparted to the investment molds and aid the production of sharply detailed castings of excellent as-cast

Fig. 4—The parts shown in this illustration are used on Army tanks. The three castings marked "S" are being produced by the shell molding process

finish. Plastic patterns can be "miked" or gaged with consistent accuracy, but we have yet to see two or more inspectors "mike" the same wax pattern and come up with the same answer.

Burn-out Requires Care—A number of foundries have had difficulties in properly burning out all plastic residue from mold cavities during regular burn-out cycles. Plastic is, of course, more difficult to burn out than wax. At Midwest, however, we realize that we are dealing with an entirely different material, and we treat it accordingly. It is virtually impossible to get totally satisfactory results when a plastic material is used in an oven atmosphere or cycle that has been set up for wax. Midwest's oven cycles are adjusted in terms of the plastic material used, and our success in casting satisfactory parts has been as good as and, in many instances, far better than it would have been had we used wax patterns.

Much experimental work has been carried on at Midwest on various types of wax and plastic materials for use in patterns. To date, our most desirable results have been obtained from a commercial grade of crystal polystyrene. We are, however, continually evaluating new wax and plastic materials with the view of discovering a material with advantages over polystyrene. Although clear polystyrene is desirable as a pattern medium, equal success is obtainable with a colored polystyrene, provided that the color is an analine dye.

These advantages of plastic patterns should prove of considerable interest to plastic molders as well as to investment casters. Each party has an equal responsibility to the other in the continual advancement of this age-old process which again is proving vital to the manufacturing industry.

While we endeavor to streamline the process and convert it to the tempo of modern piece-part manufacture, let us not overlook the tremendous possibilities offered by the process as it was used traditionally. Time and again, we all are confronted with the task of fabricating just one or two complexly designed pieces in tough alloys that require countless man and machine hours to complete.

In such situations, it may be far easier than any other course to form wax or plastic or a combination of both into the desired shape and then have it cast in any alloy desired. The utility of the investment casting process should be recognized readily by model builders, experimental laboratories and all others faced with the problem of producing that first piece.

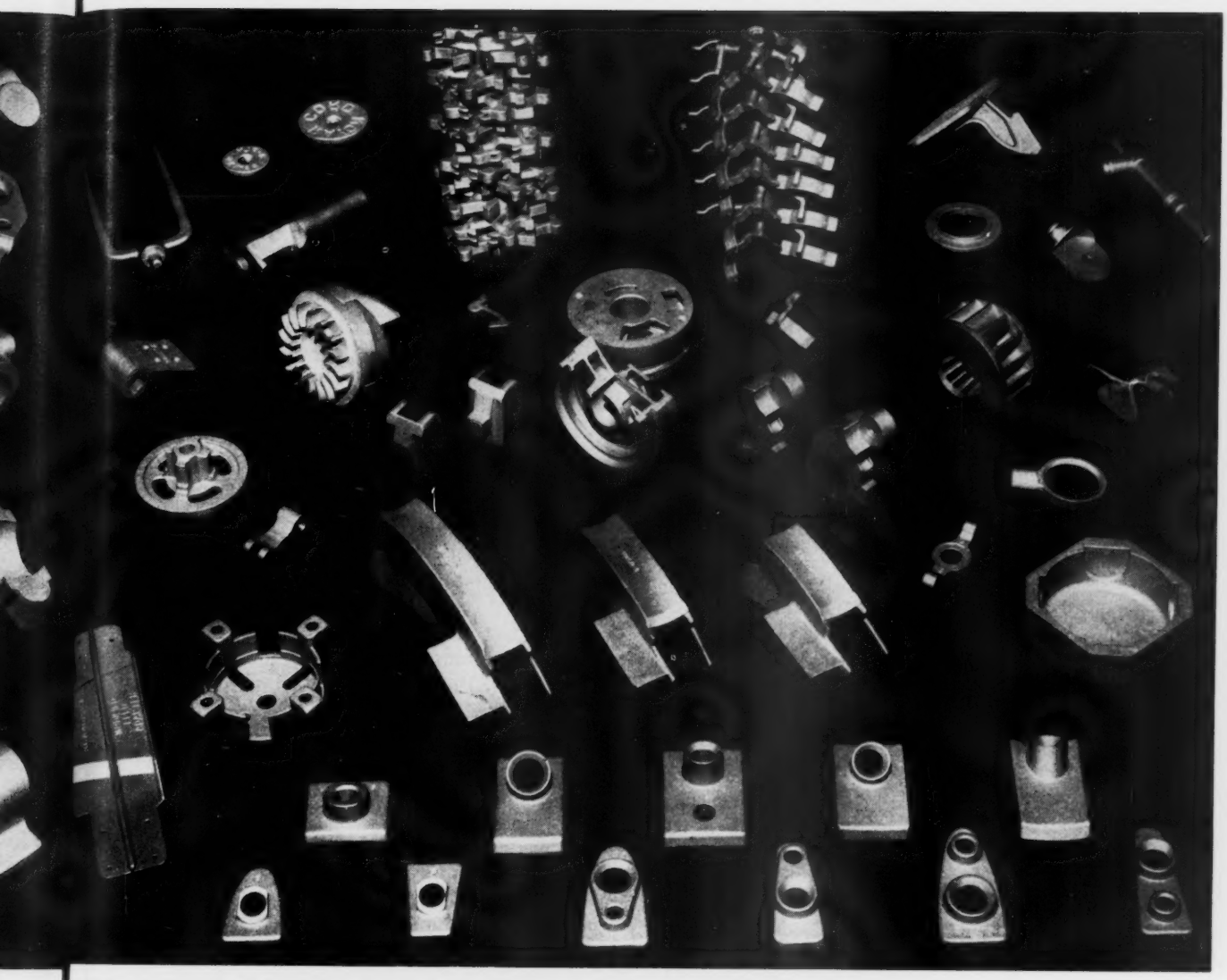


Fig. 5 (above)—The parts shown here are typical examples of kinds that were formerly considered to be practical applications for the process

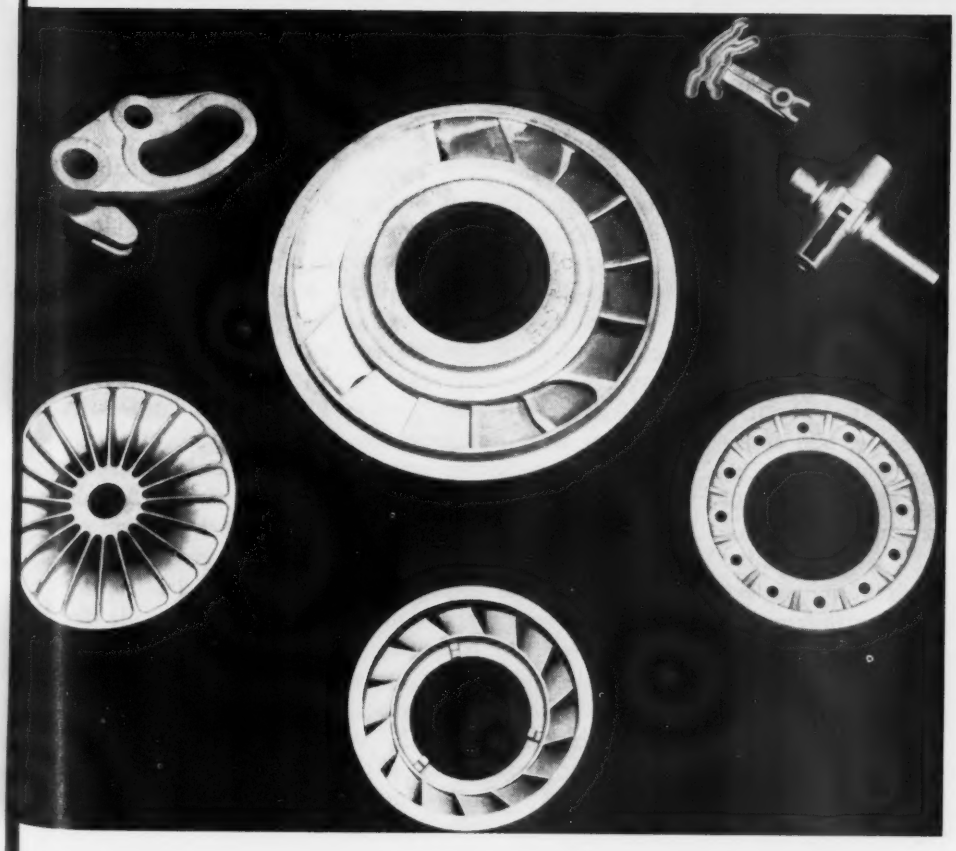


Fig. 3 (left) — This view shows some of the larger castings currently being produced. The large nozzle diaphragm has a major diam of 13¾ in. and weighs about 50 lb as cast

Drops Cupola Bottom Onc

In this article, the author describes how a small Ohio foundry drops the bottom of its basic-lined cupola only once a week and also outlines some of the advantages that have resulted from this practice

BOTH small and large gray iron foundries are brothers under the skin since, if they are to stay in business, they must supply a quality product at a competitive price and do so profitably. To do this, each company must be ever mindful of keeping production costs at the lowest possible level by endeavoring to improve all operational procedures involved in making castings. Unfortunately and too often, small foundries in general point out that while such methods are fine for their big brothers, small shops do not have the necessary supervisory, technical and clerical help to carry on such a program. While that objection appears logical, a little thought will indicate such an attitude is open to question since a number of progressive small foundries do not let size-fixation interfere with their efforts to produce quality castings at minimum cost.

Such endeavors, as might be expected, are not conducted on the scale of the large foundries, but rather are the result of the co-operative efforts of the small management-supervisory group in keeping conversant with developments in the foundry field—and then finding time in between their regular duties to adapt those applicable to their own practice. Finding the time of course, is the crux of the situation, and many will argue that in the small foundry the management-supervisory group is more than fully occupied in carrying on its assigned duties. However, where there is a will to do something, ways and means can be found to accomplish it.

For example, in 1946 the Zoller Castings Co., was organized to produce light gray iron castings up to a few pounds in weight. The plant is located about 1 mile outside Bettsville, O.—a small town of 800 population which is 35 miles southeast of Toledo and 85 miles southwest of Cleveland. One of the early problems of the firm was the recruitment and training of employees, but that was accomplished without much difficulty, and today the firm has about 25 employees who produce between 9 and 12 tons of castings a day with a shop loss of about 3 per cent. Quality of castings shipped to customers is excellent as indicated by company records relating to over 351,000 castings weighing an average of 1.67 lb each shipped to five different customers and comprising 30 different jobs for heaters, automotive, appliances, steam traps, and equipment. Customer returns totaled just under 0.07 per cent. Highest return was 0.5 per cent on steam traps which involved intricate coring. One customer receiving over 75 per cent of the total castings mentioned which comprised seven different jobs, made no returns.

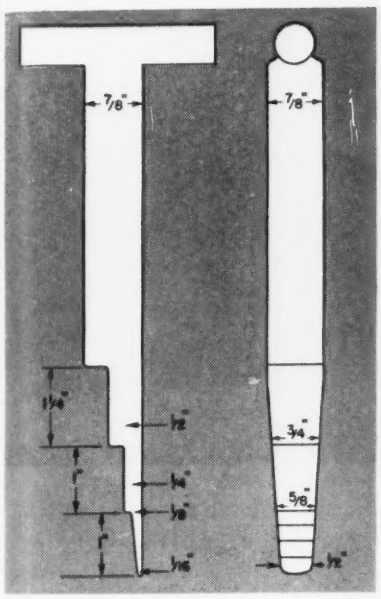
A great part of the Zoller Casting Co. ability in attaining and maintaining such records is attributed by its president Robert H. Zoller to its cupola melting practice. Up to 1950 the firm used the conventional acid-lined cupola, but early in that year became interested in obtaining better melting control as well as reducing melting costs. After due consideration of all phases involved, decision was made to investigate the possibilities of basic refractory in the cupola.

In co-operation with Basic Refractory Inc. which has a refractory plant in nearby Maple Grove, O., the cupola was lined to 28 in. ID with basic wedge brick. While it was found that the cupola could be operated for a week without repair, there was considerable attack along the numerous joints of the brick composing the lining. After several weeks' operation and experience with magnesite patching material, a decision was made to try that material for complete lining. Forms were made, and a monolithic lining of the magnesite patching material rammed into place. That appeared to permit better control of slag and iron, and less repair work was needed at the week end due to elimination of joints. However, each night the bottom was dropped, a new one put in place, with a coke bed to be lighted each morning. That seemed to involve a considerable amount of unnecessary work so a trial was made to see what would happen if the bottom were not dropped. The first week the bottom was dropped every other day; then the time was extended to three days, then four, and finally five days. That was not easy at first since experience had to be gained in insuring thorough draining of slag, and elimination of any pockets at the taphole.

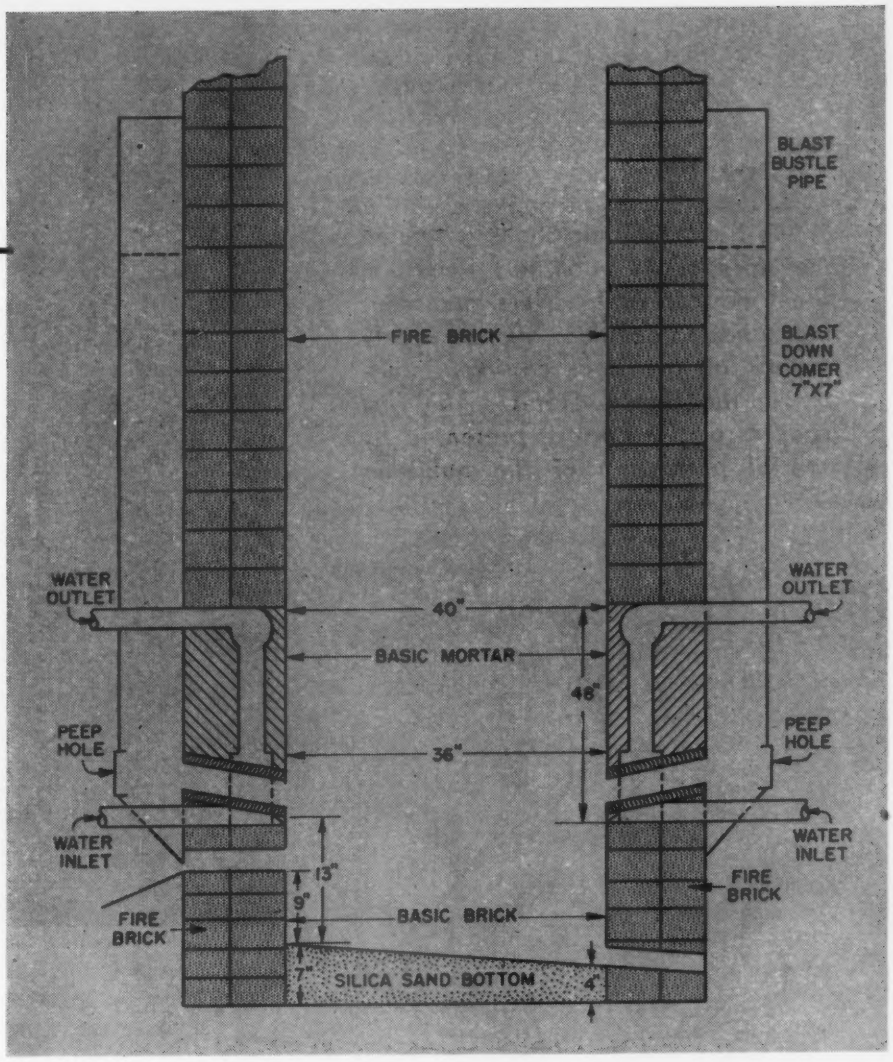
However, it was found that 20 to 30 minutes drainage after the last iron was satisfactory. Then the slaghole and tuyeres are plugged and a small opening at the taphole permits sufficient entry of air to maintain combustion in the coke bed left in the cupola. Previous to starting the next morning, the blast is turned on for a few minutes to blow out the ash accumulated during the night. Loss of bed height in

Week

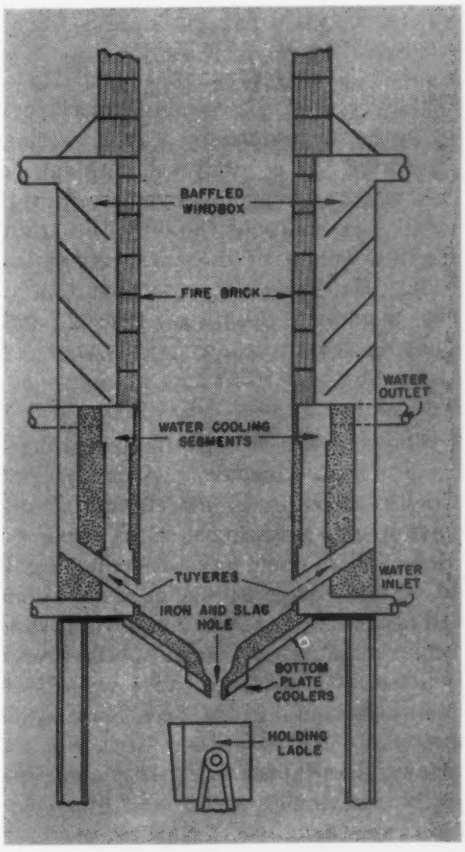
By EDWIN BREMER
Metallurgical Editor



Step design test bar used in hourly chill tests at cupola spout for control of the iron



Cross-sectional diagram of cupola after water segments were installed to reduce burnout of refractory



Taphole of this water-cooled cupola is at the apex of the conical bottom. Tuyeres and bottom incline 35 degrees from the horizontal

that period is from 10 to 12 in. Following the blowing of the ash, sufficient coke is added to bring the bed height to 48 in., and, when the bed is burned through, charging is commenced.

As might be expected the practice of dropping the bottom only at the end of the week was well worthwhile. One striking advantage is that first iron out of the cupola as well as succeeding iron is as hot as the last iron out. All the labor and time involved in removing the drop, preparing the bottom, and building a new bed is eliminated, and that costwise more than offsets the extra coke required to bring the partially burned-out bed to normal height.

After operating the cupola with the rammed monolithic lining and weekly bottom dropping for about 20 months, consideration was given to possible improvements particularly with reference to reduction of refractory burnout. Water cooling appeared to offer a solution. To obtain (*Please turn to page* 298)

SAND IN THEIR SHOES

THE STORY OF AMERICAN STEEL FOUNDRIES

While Sand in Their Shoes *is termed the story of its publisher, American Steel Foundries, it offers numerous interesting sidelights on the early history of the steel castings industry in the United States. The first chapter of this book is presented by special permission of the publisher*

By FRANKLIN M. RECK

Illustrations by John Langston

THE company known as American Steel Foundries is the largest maker of steel castings in the United States. It is many other things besides, but that can wait. The company's steel castings are found mostly on railroads, holding the train together, taking the weight of the cars, easing the shocks of the rails. But they are also found in oil fields, ships, big machines, highway trucks, and army tanks. They're found in any spot where you need more strength than iron and a shape no other process can achieve.

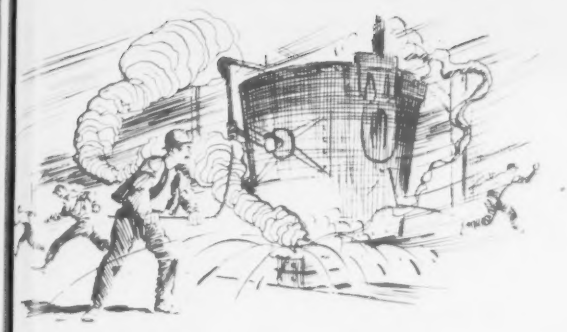
The company likes to improve things. Its engineers, metallurgists and test experts are hard to please. They're apostles of discontent. Working with their customers, sometimes with other foundries, often alone, these men have been poking into the nature of things for a couple of generations, with the result that they've done much to advance the art from its uncertain beginnings to its present state of excellence. Because of ASF we ride more safely on trains today, and so does a crate of eggs. We're better off in many other ways that the public seldom knows about because ASF's contributions are modestly hid underneath something else, where folks don't see them.

American Steel Foundries began in many places. It began in eight different foundries scattered from the Mississippi to the Atlantic. Some of these foundries stretch their roots deep into the past, to the beginnings of the art in this country. We'll begin this history with the story of one plant and its discovery:

Ten years before American Steel Foundries came into existence the cast steel expert of Schickle, Harrison & Howard Iron Co. in St. Louis was struggling with a problem. He was a big man, with a voice like a bull. He was absolutely fearless and impatient of those who were less fearless. There were those who called James G. McRoberts, "that wild Scotch-Irishman."

McRoberts had reason to be wild that November day in 1892. On the 19th, the superintendent Tom Gallagher had handed him the patterns for a cast steel wheel and told him to cast 24 of them. The patterns made McRoberts shake his head in doubt. They were a peculiar design and he suspected that the wheels would pull apart as the metal cooled in the baked molds then in use.

He was right. They had checked and cracked and pulled apart, and now, after ten days of struggle,



only part of the order was filled and scrap wheels were piling up in the corner. The customer, a George J. Fritz, was in the front office pounding the table. If the foundry couldn't finish the order within 24 hours, by Satan, he'd take his patterns and go elsewhere.

With a growing sense of futility, McRoberts had five more of the dry sand molds made up, this time using new sand mixtures and employing other devices to make the metal cool properly. With a silent prayer he had the ladleman pour the steel.

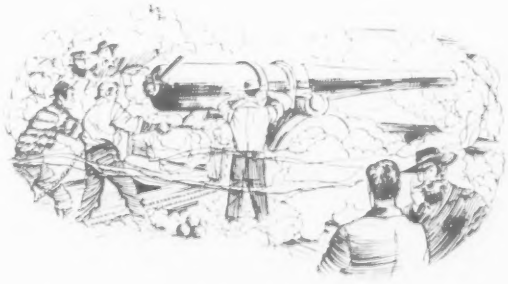
"If these are okay," he was thinking, "maybe Fritz will cool off."

He shook them out, took a long look, and slumped. Only one of the five was good. The rest were fractured and pulled apart. At this rate, they were about to lose a customer.

Driven to a corner, a man will think of many things. Big Mac now remembered something that had happened a year ago in East St. Louis, at the St. Louis Steel Foundry Co. There, instead of dumping surplus steel into the foundry floor, as some shops did, McRoberts had the extra metal poured into small ingot molds. This kept the sand and dirt out of the steel and left it in good shape for reuse.

One day, a molder came to McRoberts just as a heat was being poured, to tell him they'd forgotten to bake an ingot mold for the surplus. There was no time to make a mold or dry it.

Rather than pour the metal on the floor, McRoberts had the molders ram up a mold out of green (unbaked) sand. He waved a hand to Charlie Hutchinson, the ladleman.



"Pour the steel in that," he ordered.

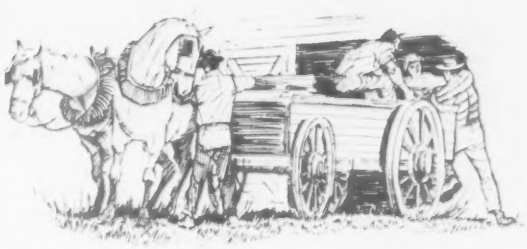
Charlie was shocked. It was well known that you couldn't pour steel into a green sand mold. It would blow and sputter. It might even form enough steam to explode.

Men gathered. Voices grew loud. The ladle waited, posed over the mold. The red crept up McRoberts' neck and presently the Irish part of his makeup took command. With a snort of disgust he grabbed the handle of the ladle while Charlie and his fellows ran for cover. The yellow stream flowed into the gates of the mold.

Nothing happened. A little bubbling at first, then the metal lay quiet. McRoberts looked satisfied while the others scratched their heads. As far as McRoberts knew, that little incident, a year ago in 1891, marked the first use of a green sand mold in the history of foundry work.

Mac was thinking of that now, while puzzling the problem of the wheels. He was wondering if a green sand mold might not be the answer. There was a chance that it might accommodate itself better to the peculiar shape of the wheel than a baked mold. Of course, he'd never used green sand for anything more complicated than an ingot, and in fact his general manager, Edward F. Goltra, had forbidden its use for customer products.

But Mac wanted to make good on the wheel order and was in a mood to take a chance. He had two green sand molds made up and taken to the casting floor and told Bill Wiedman and Bob Allison how he



wanted them poured.

The two men looked at the molds, turned away, and shook their heads. "Charlie Hutchinson told us not to," one of them explained. "They'll blow up."

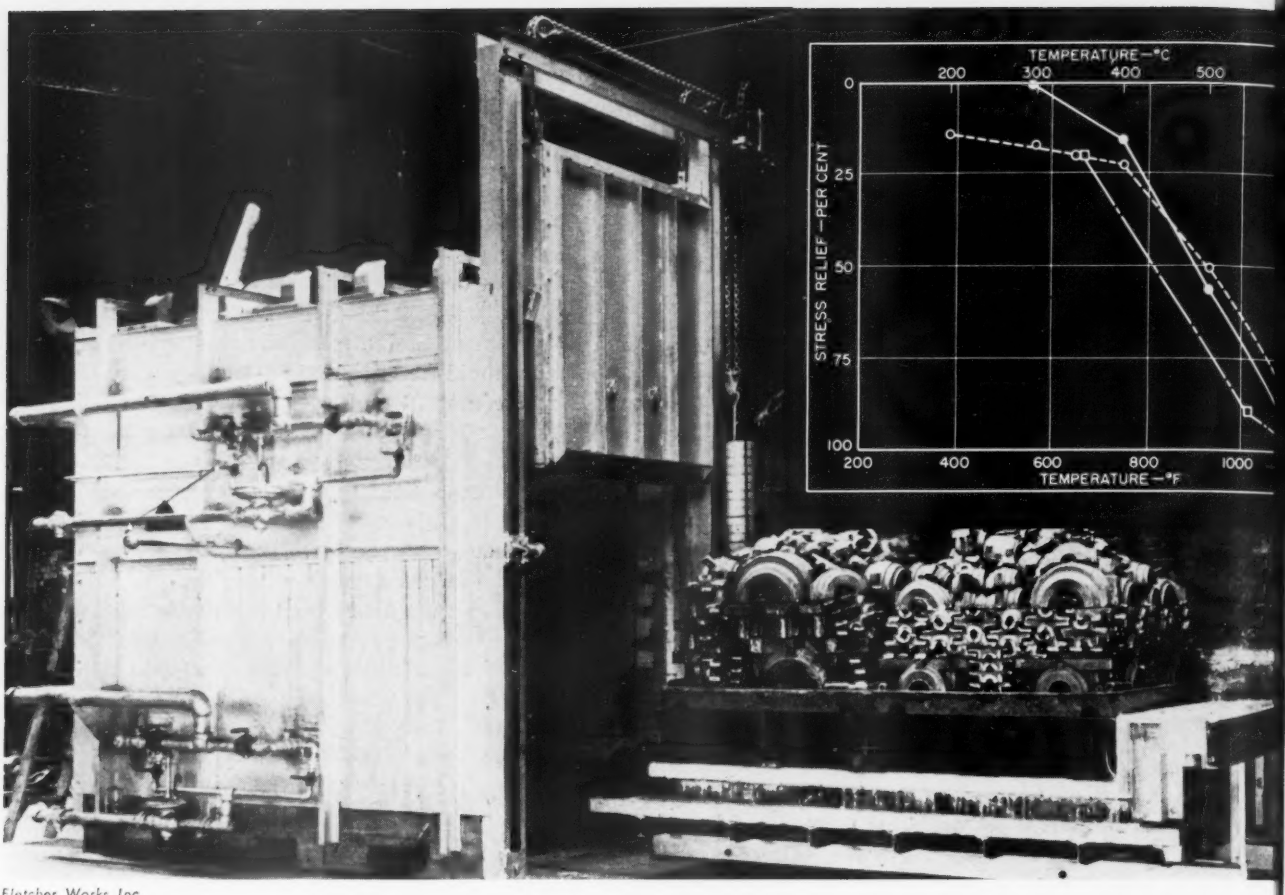
So once again McRoberts grabbed the pouring handle while the rest took shelter a safe distance away, and once again the molten steel ran into the gates of a green sand mold.

Forty feet away, two men stood laughing, waiting expectantly for fireworks. As the molds slowly filled their grins faded.

But the real test was to come when the wheels were shaken out. Most foundrymen believed that shapes poured in green sand would be full of blowholes and therefore no good. When these two wheels were inspected, however, they were found to be satisfactory in every respect.

The next day four more wheels were poured and these, too, were good. The order was filled, the customer was reasonably happy, and a fond foundry tradition had been blown to bits.

McRoberts' success with the car wheels made a convert of Edward F. Goltra. This Princeton graduate was quick to realise that here was a revolution in foundry practice. Up to now, nobody had ever considered using anything but dry sand molds. This "dry sand" was actually a combination of silica sand and fire clay to which rosin, dextrine or flour had been added to bind the mass firmly together in the desired shape. The (*Please turn to page* 305)



Fletcher Works Inc.

Truckful of pillow block castings is ready to be pushed into stress-relieving furnace

Stress Relief of GRAY IRON

This second and concluding article outlines the effect of the stress relief temperature, time at temperature and the rate of cooling on the ability to eliminate stresses in various classes of gray iron castings

By CHARLES O. BURGESS
Technical Director, Gray Iron Founders' Society

STRESS relief of a casting can be defined as a process of reducing residual internal stresses by heating it to a certain temperature (usually well below the transformation range of pearlite into austenite) and holding it for a definite time at that temperature.[5]

The stresses are removed by a lowering of the elastic limit as the gray iron or other metallic object is raised to the stress-relieving temperature, and by a consequent plastic deformation, creep or movement in the gray iron sufficient to relieve almost completely any internal stresses.

The term "almost completely" is employed since the elastic limit of the metal is not reduced to zero at the temperatures usually selected, and some stresses, normally negligible, always remain.[5]

From this definition, it is clear that the main factors influencing stress relief are the temperature of the treatment and the length of time the casting is held at that temperature. Stress relief clearly becomes more effective as the temperature is increased; the temperature, however, should not be high enough to alter the structure and properties of the gray iron, particularly if such changes might adversely affect the castings' serviceability. The problem then is to select a temperature or tempera-

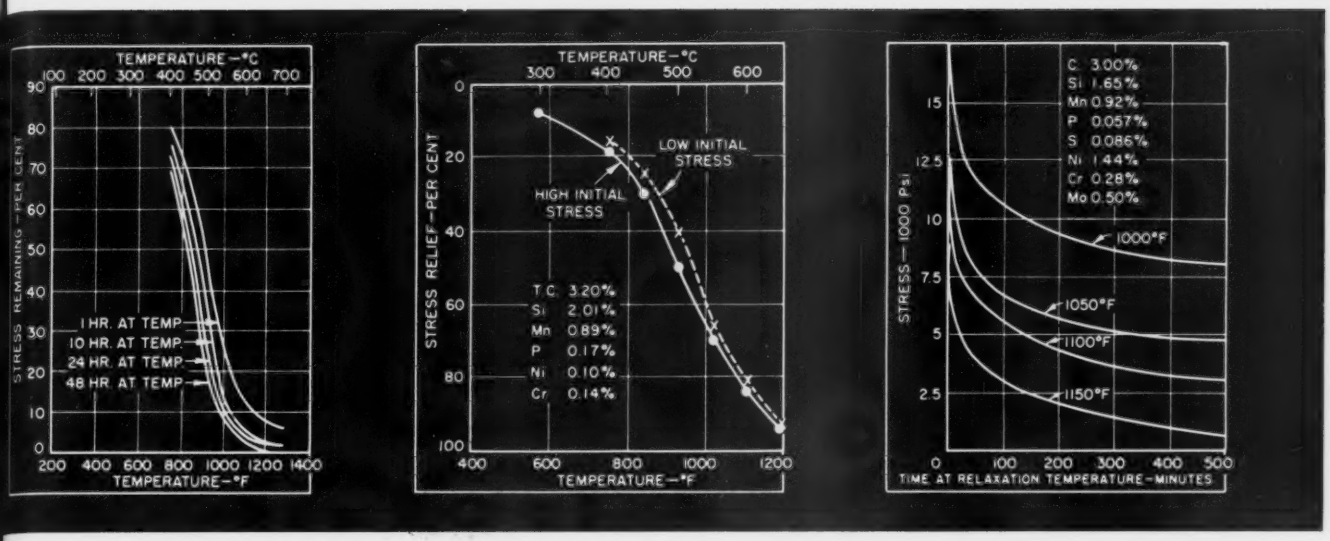


Fig. 6 (far left above)—Effect of stress-relief temperature on per cent of stress removal. Fig. 7 (above)—How time at stress-relief temperature affects stress removal. Fig. 8 (right)—Effect of stress-relief temperature on stress removal from low-Cr iron. High and low initial stresses 15 and 7.5 tons/sq in. Fig. 9 (far right)—How initial stress in a low-alloy iron is decreased

ture range that will give the greatest possible relief of internal stresses with the least possible alteration of properties.

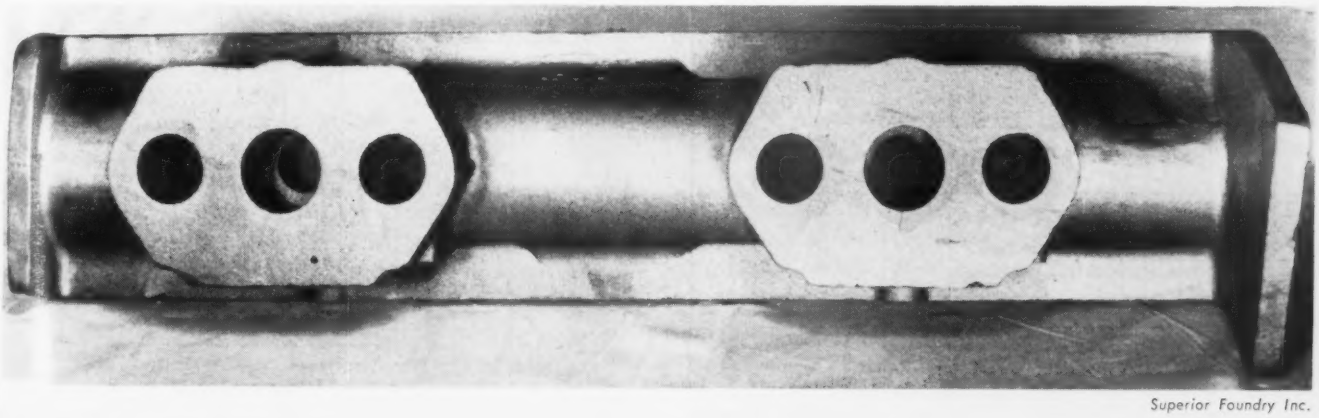
It can be seen from Fig. 6 that the amount of stress relief below about 750°F is small, but increases rapidly at higher temperatures. It thus appears that if substantial stress relief is necessary, a temperature of at least 950°F is advisable.

It should be noted that a few foundries[17, 17a, 19] habitually employ a lower temperature range for stress relieving, i.e., 700-850°F. Holding periods in excess of one hour are common, using these lower temperatures. The approximate 15 to 30 per cent relief of internal stresses is apparently adequate for their type of castings, and they report the resultant dimensional stability has been sufficient to maintain alignment in castings used as machine tool parts, as large surface plates, etc. Certainly in cases where equipment or time for slow cooling from higher stress-relieving temperatures is not available, use of this lower temperature range can be helpful.

Surveying the available experimental information and tests on commercial castings, it is evident that in order to get maximum relief of stress with minimum chance for decomposition of combined carbon, a temperature range of 950-1050°F is desirable.[3, 4, 11, 12, 13, 14] Fig. 7, taken from Gilbert[14] indicates that from 60 to 80 per cent of all internal stresses can be removed on holding for one hour in this range, and the evidence of other authorities is in excellent agreement. The curve in Fig. 7 was based on a 3.37 per cent C, 1.58 per cent Si, 0.98 per cent Mn, 0.095 per cent S, 0.78 per cent P iron, but, on the basis of other investigations, holds for gray irons over a wide analysis range.

In rare cases where almost complete stress relief—over 80 per cent—is necessary, a minimum temperature of 1100°F can be employed, but except in low-carbon-equipment, high-duty irons, possible sacrifice in the mechanical properties must be considered. It is a fortunate circumstance, however, that the higher-carbon-equivalent soft irons normally exhibit a lower level of internal stress and a comparatively low creep resistance. In fact, high-carbon-equivalent irons can be stress relieved satisfactorily at the lower end of the suggested temperature range, i.e., at temperatures not exceeding 1000°F.

The diesel engine crosshead casting shown here was stress relieved at a temperature of 1150°F



Superior Foundry Inc.

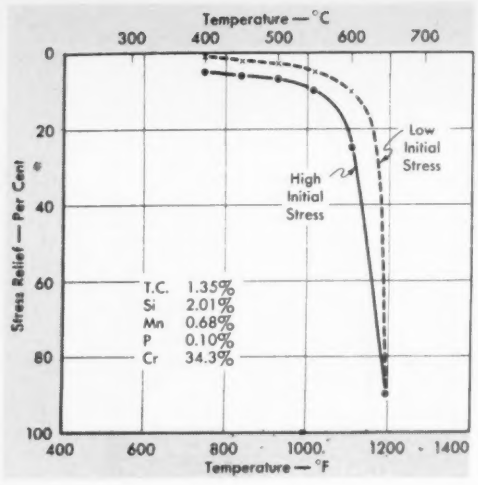
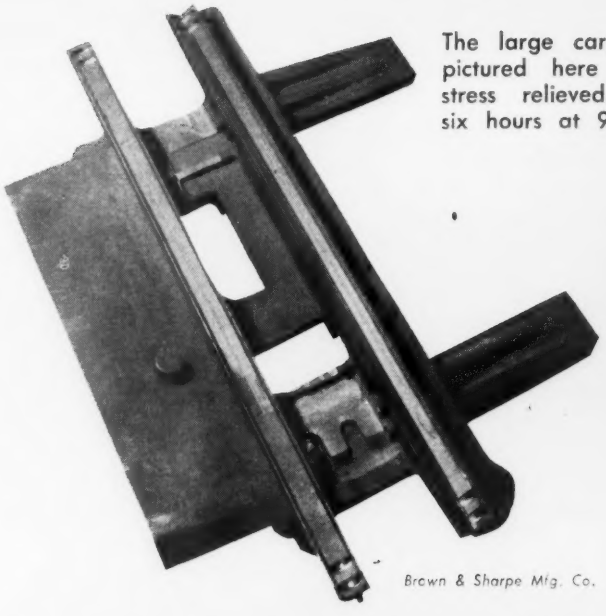


Fig. 10 — Effect on per cent stress removal in high-chromium iron of stress relief temperature



The large carriage pictured here was stress relieved for six hours at 950°F

Brown & Sharpe Mfg. Co.

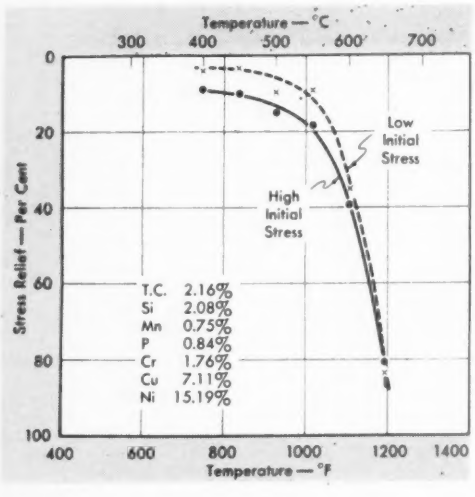
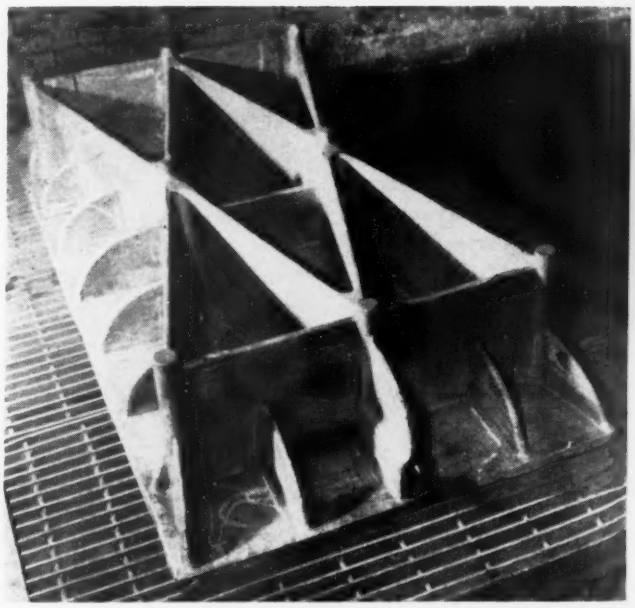


Fig. 11—Effect on per cent of stress removal of stress-relief temperature in Ni-Resist iron



Brown & Sharpe Mfg. Co.

This surface plate, which is roughly machined, is ready for stress-relief treatment at 950°F

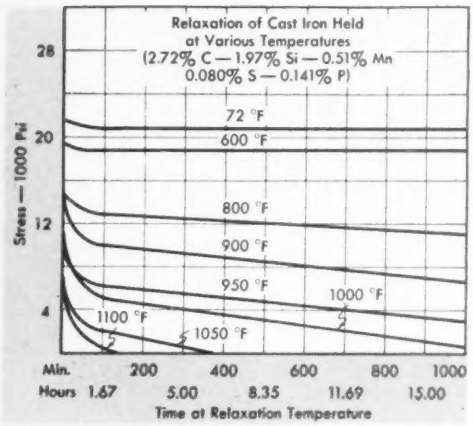
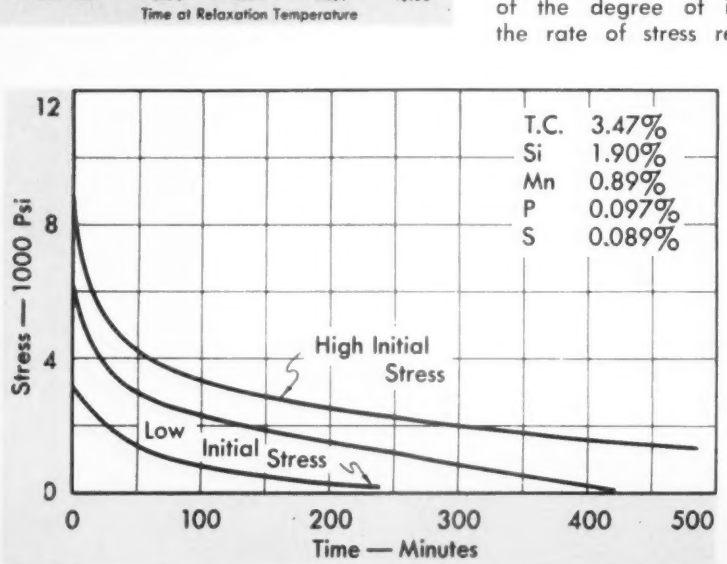
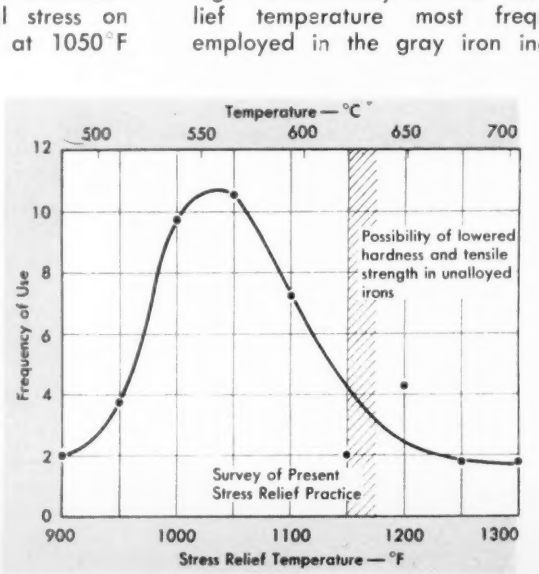

Relaxation of Cast Iron Held at Various Temperatures
(2.72% C — 1.97% Si — 0.51% Mn 0.080% S — 0.141% P)
28 20 12 4
Stress — 1000 Psi
72 °F
600 °F
800 °F
900 °F
950 °F
1000 °F
1100 °F
1050 °F
Min. 200 400 600 800 1000
Hours 1.67 5.00 8.35 11.69 15.00
Time at Relaxation Temperature

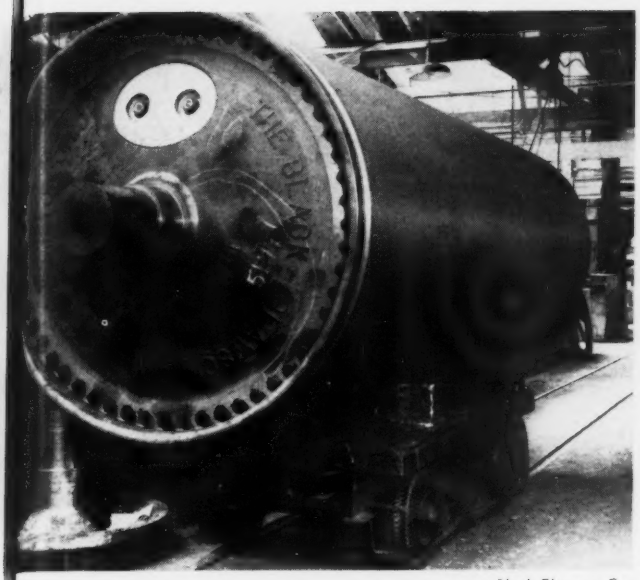
Fig. 12 — Effect of time at stress relief temperature on decrease in initial stress in cast iron

Fig. 13—This chart shows the effect of the degree of initial stress on the rate of stress relief at 1050°F

Fig. 14—A survey of the stress relief temperature most frequently employed in the gray iron industry

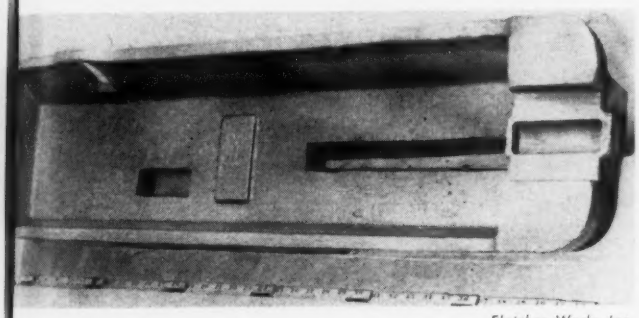



Temperature — °C
500 550 600 650 700
12 10 8 6 4 2 0
Frequency of Use
Possibility of lowered hardness and tensile strength in unalloyed irons
Survey of Present Stress Relief Practice
900 1000 1100 1200 1300
Stress Relief Temperature — °F



Black-Clawson Co.

Temperatures of from 1050 to 1100°F were used in the stress relief of the head of this dryer



Fletcher Works Inc.

Stress-relief temperature employed on this bed casting for a 50 caliber shell trimmer was 1050°F

In the case of low-alloy gray irons a different condition exists and higher stress-relieving temperatures of the order of 1050-100°F are usually advisable. Alloys such as chromium, molybdenum, nickel and vanadium, tend to increase the resistance of the gray iron to creep, i.e., to prevent the plastic deformation at a given stress relieving temperature necessary to reduce or eliminate internal stresses. The obvious remedy is to increase the temperature moderately.

In addition, the presence of elements such as chromium and molybdenum tend to prevent the premature softening that might occur in an unalloyed iron at such higher stress relieving temperatures. Nickel and, to some extent, copper have a somewhat similar effect in delaying softening, at least to the degree that they permit a reduction in silicon content or, in the case of nickel, are present in sufficiently large amounts to influence the transformation behavior of the iron.

Although no true quantitative data exists as to the effect of alloys on the optimum stress relieving temperature, as little as 0.14 per cent Cr added to a 3.20 per cent C, 2.01 per cent Si base iron, permitted exposure of the iron for one hour to a temperature approximating 1200°F[10] without sacrifice in its tensile strength. Figs. 8 and 9 show the relationship of relief of stresses to temperature for this iron and a low-alloy nickel-chromimum-molybdenum iron[9] typical of those commonly used in industry.

That the stress-relieving temperature applied to such alloy irons can be extended as indicated to at least 1100°F without an adverse effect on their structure or properties has been attested by numerous investigators.[3, 4, 10, 11, 12, 13, 14]

If very highly alloyed irons are employed, a still higher stress relieving temperature is necessary. In fact, as shown in Figs. 10 and 11, stress-relieving temperatures in the range of 1100 to 1200°F are needed.

For purposes of comparison it might be noted that steels, which, of course, exhibit lower carbon equivalents than any gray iron, are stress relieved in a 1080 to 1200°F temperature range, indicating that carbon equivalent has much less influence on the optimum temperature for stress relief than alloy content. It is of engineering interest, however, that experience has shown[18a] that steels even after stress relieving at 1200°F or full annealing do not show as great dimensional stability as gray iron in critical applications such as bearing shells.

Table I, on page 303, summarizes recommendations for stress-relief temperatures.

If service requirements of the casting demand a particularly low degree of residual stress, temperatures about 50°F above those listed may be used. Using these top temperatures, it is advisable in cases where such properties are critical to check the hardness of the stress-relieved casting to determine if any sacrifice in hardness or strength properties has taken place.

Influence of Time—Fig. 12 shows the amount of stress relief accomplished at various temperatures over various lengths of time. The iron used in these tests had a composition of 2.72 per cent C, 1.97 per cent Si, 0.51 per cent Mn, 0.080 per cent S, 0.141 per cent P, but parallel results have been obtained using other types of gray iron[9] (see Fig. 7). It will be noted that (1) the majority of the stress relief takes place during the first hour after the casting reaches the desired temperature and any further stress relief takes place only at a very gradual rate on longer holding at temperature, and (2) the time in which effective stress relief is accomplished decreases with increasing temperature.[9, 16] It is evident that to use low temperatures and long holding times as an effective substitute for higher temperatures in stress relief usually is impractical.

Influence of Rate of Cooling—The differential contraction of separate parts of a casting or the surface as opposed to the interior of a single part, as explained in the introduction to this section, is one of the main causes of internal stresses. It is obvious that if, after the stresses have been relieved, the casting is allowed to cool rapidly to room temperature, new stresses may be set up and the object of maximum stress elimination will not be fully achieved. For this reason, slow cooling from the stress relieving temperature, at least in the upper temperature ranges, is an essential part of the process.

For example, it is generally recommended that the part be furnace cooled *(Please turn to page 302)*

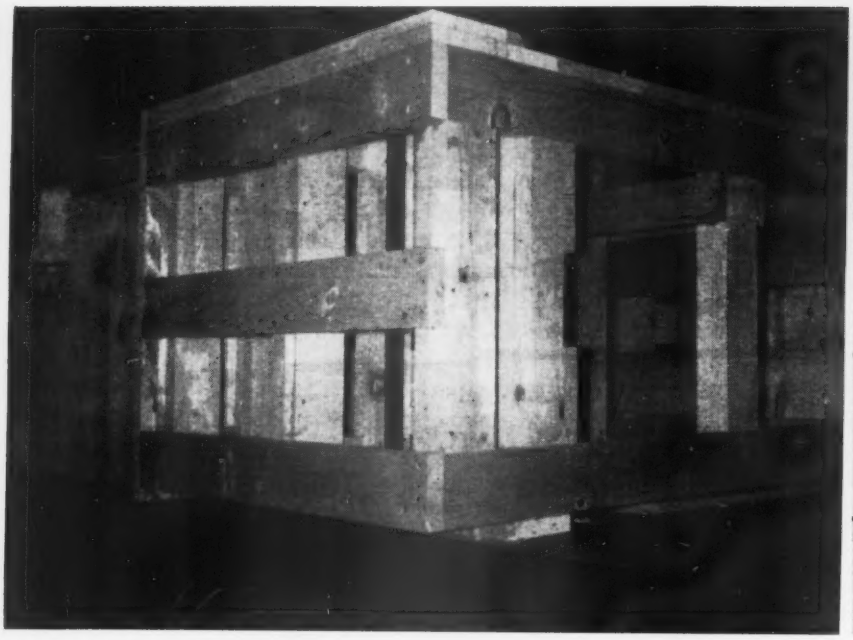


Fig. 1—This view shows how heads are spaced as required and tied together with 2 x 6-in. rails

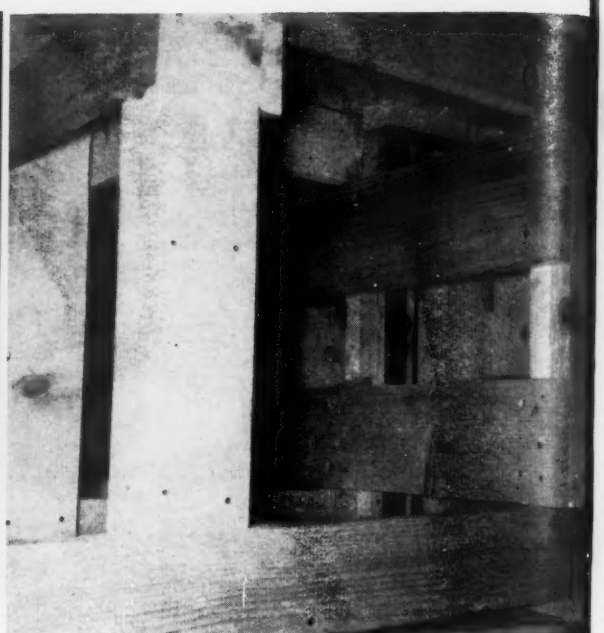


Fig. 2—Inner bracings are in place, and the rail, lagging and drawstrap (against head) are visible

What Is a Good Pattern?

Skilled patternmaking is more essential than ever before to the production of good castings. In this article, the author outlines some vital steps in the construction of a large and complicated pattern, stressing the need for co-operation between designer and patternmaker

By WALTER SIEBERT
Cleveland Standard Pattern Works
Cleveland

IN THIS age of specialization the skillful craft of patternmaking is one of the few that have not fallen by the wayside of the semiskill classification. Actually, due to the demands of industry for faster production and better machines, the patternmakers' skill is needed more than ever before. Everyday contact with complex production equipment can be cited as proof of this.

Naturally, this contact can be followed up only by the skill required to make patterns for up-to-date machine tools. The machine tool industry has mushroomed into one of the largest single industries in the nation, and the wide variety of machines, their uses, and complexity of their design make it a challenge to the patternmaker. Young men must be trained to realize fully the importance of proper construction methods to be employed in such pattern equipment.

A large and complicated pattern for a minimum of 50 castings entails the following important steps:

First, a thorough discussion with the designer permits the patternmaker to become familiar with the purpose and design of the parts to be made. It is necessary to verify the most important machining surfaces and the dimensions which are to be held to closest tolerances. This information may be the deciding factor in determining which part of the pattern must be molded in the drag. Sometimes the choice may involve more pattern work to obtain a moldable pattern and still meet the conditions of keeping the heavy and most important metal surfaces in the drag.

Next in line of discussion must be the core design for all internal cavities. It is important to determine whether any coolant tanks for either water or oil are incorporated in the design. Cores for such cavities must be so arranged that adequate coreprints can be used. With the designers' permission, additional holes in walls may improve core design.

Visit the Foundry—Once all the necessary information has been obtained, the next and most important step is to visit the foundry that is to make the casting. With the basic knowledge obtained from the designer, the foundryman will then make the final decision as to type of pattern equipment required to obtain a good casting. Sizes of flasks in use will determine sizes of necessary coreprints, and core oven capacity will determine the size of the coreboxes to be made. Perhaps, to avoid heavy rollovers, the foundryman may decide to make the mold in a pit. This, of course, will have a definite bearing on the pattern design.

This, then, is the foundation to an intelligent approach toward the construction of large pattern equipment. After all necessary layouts have been made, which should consist at least of a typical cross section, construction of the pattern can begin. The heads, which are to receive the outer shape of the pattern, must be constructed very sturdily since they form the backbone of the job. A lamination of 2 x 6-in. stock, which is glued and nailed and provided with sufficient cross members, usually will suffice.

The heads then should be spaced on a level surface to the required length, spaced on 16-in. centers and tied together with 2 x 6 rails. See Fig. 1. For increased rigidity of construction, rails may be recessed into the header frames. The lagging, or outer

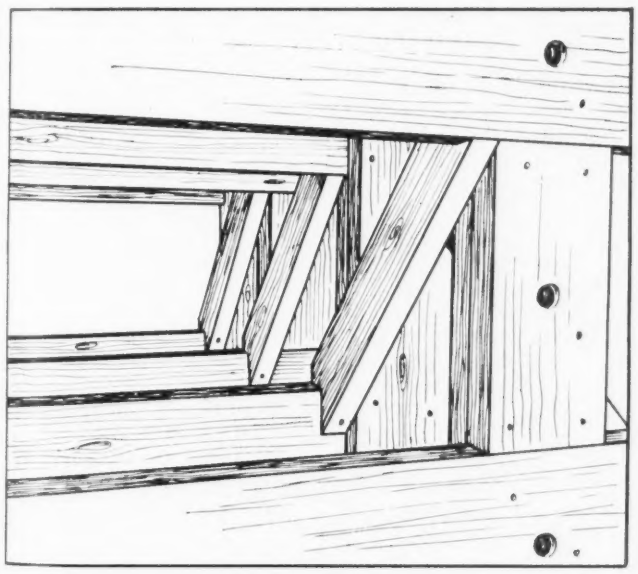


Fig. 3—Another view of the inner bracing is shown here. On the center leg in the foreground are the heads of three lagbolts holding drawstrap in place

shell of the pattern, should be applied vertically to aid pattern draw. At least 1⅜-in. stock should be used to prevent the lagging from bowing under the strain of ramming.

Before this lagging is applied, inner bracing consisting of 2 x 10-in. stock is fastened to the inside of the heads toward the cope side of the pattern, as shown in Fig. 2. Center cross bracing also should be used.

A large heavy block should be fastened securely where rapping plates must be used to make these plates effective. Next, draw straps of ¼ x 2¼-in. iron must be installed. Straps should run the full width of the bead, and the ends of the straps should be bent under the head for full pulling strength. Bolting the straps in place is advisable. When a pattern is used in a flask that is rolled to ram up the cope, secondary straps also must be installed to handle the pattern from the cope side and to permit placing the pattern in the flask.

All these conditions being met, finishing the outer layer of the pattern can be completed. Care must be taken to incorporate a protruding surface solidly into the lagging to produce a pattern of maximum strength. Loose pieces, which usually are unavoidable, must be held to a minimum. This can be done by coring under them where it is practical. If a loose piece cannot be avoided, it must be fastened to a dovetail. Good practice dictates use of ram-up cores on such large loose pieces as may be found near or at drag line. Such practice aids the molder in extracting loose pieces from the bottom of the mold; a poor draw of such pieces requires slicking in a very awkward area.

Coreprints should be of sufficient size to support the core and of proper design to prevent incorrect core placement. Placement of cores usually is the patternmaker's responsibility. Some patternmakers reason that if the wrong core is set in a mold, the molder will discover the mistake when he tries to set a second core. Such false reasoning causes much extra work and damage to the mold.

Coreboxes Require Care—Considerable care should be devoted to the construction of wooden coreboxes. Outer shell of the box must be made of 2-in. stock with ends rabbeted into the sides for extra strength. Regardless of the shape of the core, an oblong or square box is recommended because it is the easiest box to roll over. Once the sand rods and a coreplate have been placed, a corebox becomes a heavy object and a round or irregularly shaped box could be the cause of serious accidents.

The same consideration given to sand ramming when building a pattern should be exercised in constructing the inside of the corebox. Design of the box should be such that coremaking is as simple as possible. Where large, loose pieces are required near the top of the box it is good practice to have a secondary lagging inside the box to form a seat for them. This provides a surface for ramming the box up to the underside of the loose pieces, placing the pieces on this surface, then ramming the remainder.

The suggestions outlined here should help in the construction of a serviceable pattern, engineered to suit good foundry practices. Excluding the ever-present human error, such a pattern should produce a casting to the expectation of the purchaser. Regarding pattern cost, it is the author's opinion that to buy other than a first-class pattern is false economy. Good equipment helps avoid foundry downtime attributable to repair or costly rebuilding of faulty patterns.

5938 FOUNDRIES Operating in United

FOUNDRY population increased slightly in the United States the last two years. Results of FOUNDRY's biennial study of the industry which comprises the basis for the 1953-54 edition of *Penton's Foundry List,* just published, show that this country has 5387 foundries, compared with 5299 in 1951. Foundries in Canada dropped from 568 to 551 the last two years. For the two countries there was a net gain of 71 to a total of 5938.

More Nonferrous Foundries—Gains in the number of nonferrous foundries were largely responsible for the increase in total shops. Currently nonferrous castings are being made in 3604 plants, compared with 3428 two years ago. Many of these foundries produce ferrous castings as well, the number of plants making nonferrous castings exclusively being 2498. It should be pointed out that the accompanying figures for total foundries and total nonferrous foundries are not the sum of data for individual metals, since many plants cast more than one metal.

In addition to the increases scored in number of brass and bronze, aluminum and magnesium foundries the last two years, an upturn occurred in the total for producers of miscellaneous nonferrous metals.

Ferrous Shops Fewer—Biggest drop in number of foundries since 1951 was among gray iron producers —a loss of 72. On the other hand, there was a net

GEOGRAPHICAL DISTRIBUTION OF THE COUNTRY'S FOUNDRIES

	Total Foundries		Gray Iron Foundries		Steel Foundries		Malleable Foundries		Total Nonferrous		Exclusive Nonferrous Foundries		Brass & Bronze Foundries		Aluminum Foundries		Magn Found
	1953	1951	1953	1951	1953	1951	1953	1951	1953	1951	1953	1951	1953	1951	1953	1951	1953
Alabama	105	99	88	84	9	5	3	3	32	33	8	10	16	16	28	28	..
Arizona	7	5	3	4	3	3	..	..	5	2	2	..	3	2	3	1	..
Arkansas	18	16	12	13	1	1	..	..	11	8	5	1	5	3	10	8	..
California	481	421	139	139	35	35	4	10	364	297	304	224	217	194	304	257	33
Colorado	44	46	20	21	5	5	..	..	27	28	21	21	17	23	25	27	..
Connecticut	145	144	55	53	6	6	6	6	103	103	81	75	82	86	82	80	5
Delaware	9	9	3	3	3	3	1	1	5	5	3	3	5	5	3	3	..
Dist. of Columbia	2	2	2	2	2	2	1	1	2	2	..	..	2	2	2	2	1
Florida	45	44	20	17	1	1	..	1	38	40	23	21	27	29	35	38	3
Georgia	69	74	50	56	3	4	..	..	35	39	16	11	24	31	31	35	..
Idaho	7	6	6	6	1	..	..	..	5	4	..	..	5	4	4	3	..
Illinois	436	441	177	186	35	30	18	20	252	233	208	183	159	158	203	201	12
Indiana	231	248	117	127	9	8	8	8	116	122	93	90	84	87	96	99	6
Iowa	88	94	57	59	3	3	1	1	43	46	26	28	26	31	36	40	1
Kansas	54	53	29	32	1	3	..	1	27	25	22	16	17	15	24	21	3
Kentucky	33	34	22	21	1	1	..	..	20	19	8	8	16	18	13	13	1
Louisiana	34	31	19	20	5	5	1	..	19	18	10	7	14	18	14	14	..
Maine	22	25	17	20	..	..	..	1	14	20	5	5	14	19	10	16	1
Maryland	43	39	20	20	2	2	2	..	28	25	20	13	24	23	23	18	2
Massachusetts	222	222	97	99	13	14	4	5	144	137	109	85	125	126	117	116	8
Michigan	386	370	170	171	31	25	9	10	218	201	180	154	152	147	152	155	16
Minnesota	95	102	54	60	5	4	1	1	44	46	31	29	34	37	39	42	3
Mississippi	11	10	11	10	..	..	..	1	6	4	..	..	5	4	5	2	..
Missouri	127	128	44	44	11	10	1	1	82	83	73	70	53	58	70	75	4
Montana	7	6	5	5	..	..	..	..	4	4	1	..	3	4	3	2	..
Nebraska	26	25	14	15	1	1	..	..	21	18	10	7	15	13	19	16	1
Nevada	2	3	2	2	..	2	..	..	2	1	..	..	2	1	1	1	..
New Hampshire	26	26	16	17	3	2	1	1	17	17	8	7	17	16	13	15	1
New Jersey	223	204	86	85	15	16	2	5	159	129	123	90	126	112	122	108	9
New Mexico	5	4	2	1	..	..	..	..	3	3	2	2	2	2	3	3	..
New York	408	405	162	169	27	26	11	12	288	266	211	182	227	213	240	233	17
North Carolina	67	69	56	56	..	..	..	..	42	48	10	12	38	41	39	44	..
North Dakota	3	3	3	3	..	..	..	..	2	2	..	..	2	2	2	2	..
Ohio	569	561	237	241	35	32	20	20	331	321	274	240	213	216	256	257	18
Oklahoma	41	41	22	26	2	2	..	1	27	26	18	13	20	17	23	23	2
Oregon	62	61	34	36	8	7	..	..	31	33	20	17	27	32	24	28	2
Pennsylvania	513	517	290	295	67	64	12	17	269	264	168	149	222	224	192	203	8
Rhode Island	39	37	13	14	..	..	1	1	27	19	25	16	23	18	21	18	..
South Carolina	25	24	20	20	1	1	..	..	19	17	4	3	17	17	18	15	2
South Dakota	3	3	3	3	..	..	..	..	1	2	..	..	1	1	1	2	..
Tennessee	75	75	62	63	4	3	..	..	36	32	12	10	27	27	32	28	1
Texas	143	131	75	73	11	11	1	1	86	79	59	42	70	65	71	66	6
Utah	19	19	16	15	2	2	..	..	8	6	3	2	8	5	7	6	3
Vermont	19	20	15	15	..	..	..	..	8	9	4	5	8	7	6	8	..
Virginia	58	64	50	55	5	5	..	1	31	41	5	7	29	37	22	36	..
Washington	74	75	38	39	18	17	1	1	51	50	27	27	43	43	42	42	2
West Virginia	39	38	20	20	3	3	1	1	21	22	15	13	20	20	15	17	1
Wisconsin	226	224	118	123	17	13	11	12	116	113	83	71	90	91	101	97	4
Wyoming	1	1	..	1	..	..	..	..	..	1	..	..	..	1	..	1	..
Total	5387	5299	2591	2659	404	377	121	144	3240	3063	2330	1969	2376	2361	2602	2565	176
Canada	551	568	363	367	36	33	16	17	364	365	168	155	284	286	313	323	13
U. S. & Canada	5938	5867	2954	3026	440	410	137	161	3604	3428	2498	2124	2660	2647	2915	2888	189

tates and Canada

gain of 30 in companies making steel castings. This increase includes only a few large plants, bulk of the gain representing investment casting and small shops.

California Spurts—From a geographical standpoint the most significant trend in foundry population shifts the last two years was the relatively sharp increase in number of producers in California. Since 1951 that state shows a gain of 60 plants; for all of the United States the increase was only 88. This reflects the growing industrial tempo that has prevailed on the West coast the last ten years. Since 1943 California's foundry population has jumped 45 per cent, against a 12 per cent increase for the country as a whole. California's expansion has been largely in the nonferrous field and has been made up principally of small foundries.

Trends in number of foundries in other leading states since 1951 have been mixed. Small gains were made in Ohio, New York, Michigan and Wisconsin, while minor losses occurred in Pennsylvania, Illinois and Indiana. Ohio still leads the nation in number of foundries, followed by Pennsylvania, California, Illinois, New York, Michigan, Indiana and Wisconsin. However, based on actual tonnage of castings produced, Michigan's large automotive foundries would help boost that state to the top.

Special Processes—The study shows a continued growth in number of permanent mold and centrifugal castings producers. It is also interesting to note that 197 foundries said they are making shell mold castings. This compares with 113 producing precision investment castings and 161 casting in plaster molds.

About 48 per cent of all foundries are strictly jobbing shops, 16 per cent are captive foundries, and the balance make castings both for sale and for own use.

Magnesium Foundries 1953	Permanent Mold Producers 1953	1951	Centrifugal Casting Producers 1953	1951	Plaster Mold Producers 1953	Investment Mold Producers 1953	Shell Mold Producers 1953	Pattern Shops 1953	Machine Shops 1953	Laboratories 1953	Jobbing Foundries 1953	Captive Foundries 1953	Jobbing & Captive Foundries 1953	
..	8		7	10	1	..	4	84	78	28	50	13	42	Alabama
..	1		1	..	1	..	..	4	4	3	4	..	3	Arizona
33	2		..	1	1	..	..	15	12	4	7	1	10	Arkansas
	70		34	25	21	15	23	297	291	108	252	82	147	California
	11		..	..	..	..	..	28	26	10	23	4	17	Colorado
..	15		2	2	2	1	4	86	87	28	79	25	41	Connecticut
1	..		..	..	..	..	..	7	8	3	3	3	3	Delaware
..	1		1	1	1	..	1	2	2	2	..	2	..	Dist. of Columbia
3	11		2	1	3	..	1	36	32	3	16	5	24	Florida
..	8		..	2	3	..	1	56	50	15	17	12	40	Georgia
12	1		..	..	..	..	1	6	7	1	3	..	4	Idaho
6	49		10	11	12	9	15	297	260	127	227	86	123	Illinois
1	29		6	7	4	2	9	157	134	69	118	45	68	Indiana
1	9		..	1	..	3	2	66	65	20	29	20	39	Iowa
1	4		..	1	1	..	..	45	27	7	24	9	21	Kansas
..	..		1	..	1	1	..	20	21	9	12	12	9	Kentucky
1	2		..	..	..	..	..	2	25	6	15	8	11	Louisiana
2	..		..	..	..	..	..	17	18	1	11	1	10	Maine
..	2		2	3	..	..	1	27	31	10	17	9	17	Maryland
8	16		9	8	5	7	6	145	116	34	122	39	61	Massachusetts
16	53		20	19	7	9	20	225	212	122	214	66	106	Michigan
3	12		1	1	1	2	2	57	53	21	51	16	28	Minnesota
..	..		..	..	..	..	1	8	11	1	2	..	9	Mississippi
4	21		3	1	1	2	2	79	78	32	64	22	41	Missouri
1	1		..	..	..	..	..	5	6	..	..	2	5	Montana
..	5		..	1	3	..	1	17	18	3	5	10	11	Nebraska
1	1		..	..	..	..	..	2	2	1	..	1	1	Nevada
1	1		..	2	..	2	..	23	19	2	12	1	13	New Hampshire
6	18		10	8	5	10	10	130	117	46	137	27	59	New Jersey
17	..		..	..	..	..	..	4	3	..	1	1	3	New Mexico
..	42		21	14	15	21	28	259	248	95	192	79	137	New York
..	1		..	..	2	..	2	51	45	5	25	13	29	North Carolina
..	..		..	..	..	..	..	3	3	..	1	..	2	North Dakota
6	66		21	20	24	12	12	362	332	161	298	105	166	Ohio
2	2		2	..	4	1	3	29	26	6	18	6	17	Oklahoma
3	3		3	1	..	1	..	35	34	13	25	4	33	Oregon
	29		22	20	7	6	14	367	341	141	241	73	199	Pennsylvania
2	3		1	..	5	..	2	32	23	7	23	4	12	Rhode Island
..	1		..	..	..	..	..	20	21	4	11	6	8	South Carolina
..	1		..	..	..	..	..	2	3	..	1	1	1	South Dakota
1	6		1	2	3	..	2	62	52	13	26	11	38	Tennessee
6	12		5	6	6	1	2	95	88	23	75	16	52	Texas
1	3		2	2	..	..	2	11	13	6	11	2	6	Utah
	..		..	..	..	..	1	18	13	1	7	3	9	Vermont
2	3		4	2	1	..	3	41	37	10	20	12	26	Virginia
1	5		2	3	1	..	4	50	37	19	36	10	28	Washington
4	2		3	4	1	..	..	29	29	8	17	1	21	West Virginia
26	9		10	4	2	9	9	136	131	63	121	38	67	Wisconsin
..	..		..	..	..	..	..	..	..	..	..	1	..	Wyoming
176	552		205	189	146	107	188	3569	3289	1291	2663	907	1817	Total
13	61		16	11	15	6	9	428	413	117	190	75	286	Canada
189	613		221	200	161	113	197	3997	3702	1408	2853	982	2103	U. S. & Canada

QUESTIONS

Sharp tools are required in machining aluminum . . . .

Cupola bottom plate . . . . . Iron is oxidized

Has surface porosity . . . . . Castings are warping

Has Complaints on Machining

QUESTION We are making aluminum castings of No. 356 alloy (7 Si-0.30 Mg) for a customer who has them machined in different shops. Some shops are complaining about the metal sticking to tools and coming off stringy, and are blaming the foundry for defective material.

ANSWER It appears to us that since some and not all of the machine shops are complaining about difficulty in machining, the trouble lies in the machining, and not the alloy. It may be that the firms having difficulty are not giving proper attention to tool grinding.

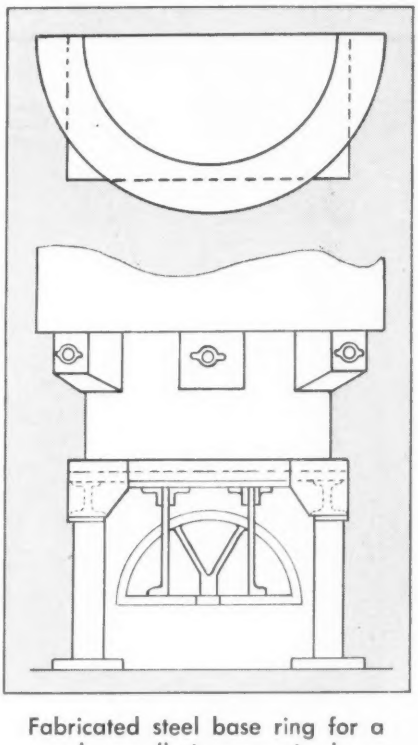
With aluminum alloys the cutting edge must be keen, extremely smooth and free from imperfections. All surfaces over which the chips must pass should be finish-lapped or hand-stoned to a high finish. The direction of finish should be in the direction in which the metal will flow over the tool edge and surfaces, since chips will tend to cling to any tool roughness and be welded by the pressure and heat of cutting.

For details relative to machining we suggest that you write to Aluminum Co. of America or Reynolds Metals Co., for a copy of booklets on "Machining of Aluminum."

Can Use Steel Bottom Plate

QUESTION It is necessary that we replace the base ring on one of our cupolas. The old ring is made of cast iron and we would like to know if a fabricated steel base ring would be satisfactory. Cupola shell is 60 in. in diam and supported by cast iron legs attached to the base ring. When we make the repair we would prefer other than the cast iron legs for support, and particularly ones which would permit more head room underneath for conducting work.

ANSWER We can see no objection to replacing the present cast iron bottom ring or plate of your cupola with one of steel since some cupolas supplied by the manufacturers have that type of construction. Usually the ring or plate is square, as indicated in the accompanying



Fabricated steel base ring for a cupola usually is square in shape

sketch, with the supporting posts near the corners.

It would be our guess that the bottom plate could be formed from ½-in. thick steel, and that in turn supported by 8-in. I-beams which rest on 4½-in. OD heavy steel pipe filled with concrete. Height of the pipe could be 5 or 6 ft or probably somewhat higher if desired for working under the cupola.

We suggest that you get in touch with any of the several cupola makers for more accurate figures.

Cupola Iron Appears Oxidized

QUESTION In the operation of our foundry, we have a serious stumbling block to overcome and wonder if you can make any suggestions. We have a 21-in. cupola with 6 x 3-in. tuyeres and an 8 x 8-in. windbox. We do not know the air pressure or volume. On the first heat we used 300 lb of iron to 30 lb of coke with a 34-in. bed. Latter height was based on the fact that metal started at the spout 10 minutes after the blower was placed in operation. We got oxidized iron and gradually increased coke splits in succeeding heats until it reached 43 lb, but the bed seems to burn away and we get oxidized iron. On one heat we used 300 lb of iron, 43 lb of coke and a 39-in. bed with increased air, but the bed still did not hold, although we got faster and hotter iron — which, however, was oxidized. We then used 250 lb of iron, 43 lb of coke and a 34-in. bed. About 15 minutes after the metal started coming over the dam, the tuyeres blocked up, and we had slow melting and cold iron. We thought this was caused by patching (1 to 1½ in. thick), but on the next heat, after the lining had been dried for two days, the same thing occurred. As before, the bed did not hold. We are striving for continuous tapping with hot and fast melting.

ANSWER One of the first suggestions about establishing a base from which you can operate your cupola properly is to find out how much air is being driven into the unit. Write to the manufacturer of the blowing unit for information on its capacity at various speeds. Then by checking the motor speed and the pulley sizes you can ascertain within reasonable limits the amount of air being blown into the cupola. A cupola lined to 21 in. should melt around 1½ tons per hr and requires about 820 cfm of air.

We suspect that you are blowing your cupola too hard—that is, you

ANSWERS

are supplying a much larger volume than required. That usually raises the melting zone to a higher level than normally would be expected and can be remedied considerably by increasing the height of the bed.

You will point out, of course, that you did raise the bed to 39 in. without getting the bed to hold up— but you increased the amount of air at the same time, with the result that there was little, if any, change in conditions. If you had just increased the height of the bed, without changing the air, you would have obtained considerable improvement. Another method would be to cut down on the amount of blast by inserting a movable gate in the blast pipe.

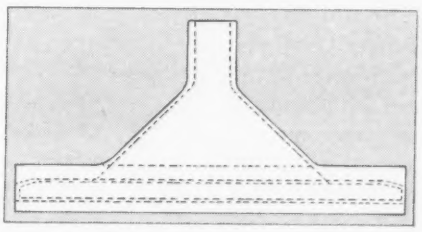
Your windbox, 8 x 8 in., seems rather small. In fact, it is not much larger in cross-sectional area than the four 6 x 3-in. tuyeres. Possibly that may have some bearing on your trouble. Someone has advocated that the wind belt or box of the cupola should have a volume equal to one second's air supply, which in this case would be about 13.7 cu ft. Hence, to obtain that volume you would have to increase the height of the wind box to approximately 32.5 in., with the 8-in. width.

If you cannot ascertain your blower's capacity and make the necessary pulley changes to bring it into the desired range, we make the following suggestions: Put in a 40-in. bed, leaving the taphole open. Burn the bed through thoroughly and then measure to see that it is 40 in. above the tops of the tuyeres. Place 6 lb of limestone on the bed, charge 200 lb of iron, followed by 25 lb of coke for the split, and follow that cycle of stone, iron and coke until the cupola is filled. Then turn on the air and time the iron at the spout. A good-sized stream of hot iron should appear in 8 to 10 minutes, after which the taphole can be botted up. If the time is longer, decrease the height of the bed a couple of inches on the next heat, using the same procedure to observe results.

Surface Shows Fine Porosity

QUESTION We are shipping two vacuum cleaner nozzles made of an aluminum alloy. One of these is just cleaned and the other is partially polished. The latter, as you will note, shows on the polished areas fine porosity, and we would like to know the cause. This trouble occurs only once or twice a week. We are using oil-fired crucible furnaces.

ANSWER The fine surface porosity exhibited on the casting after it is polished is caused by gassy



Fine porosity on surface becomes visible on polishing and buffing

metal, and the fact that it occurs spasmodically indicates that closer attention should be given to melting. It is possible that when trouble occurs, the metal may have been left in the furnace longer than usual or heated to too high a temperature. Both circumstances increase the tendency toward gas pickup.

Possibly, but not unless the trouble was prevalent during the whole day, it might be due to high-humidity weather. Another possible cause is poor pouring practice which permits air entrainment. You do not mention whether you are using any degasifying procedure, and it may be that you can overcome the trouble by employment of nitrogen or chlorine, or with one of the solid degasifying agents.

Castings May Warp Up or Down

QUESTION We are at a loss to account for the behavior of side bar castings for stationary grates made in lengths from 56½ to 120 in. Some of these casting warp up at the ends, others warp down. The patterns are straight and there is nothing in the design to suggest undue contraction. The longer castings do not warp. All our trouble is confined to lengths between 56½ and 83 in. We have verified the straightness of the mold, cope and drag, with a straight edge before closing the mold. We have poured the castings two-up at each end, also one up at each end with a third gate near the center, but the castings are crooked. The most peculiar feature of the problem is that some times all the castings from a heat will come straight. More frequently 40 per cent are warped while the remainder are straight. We have poured iron at various temperatures, but apparently this factor is not responsible. We shall appreciate your opinion on this subject.

ANSWER You have eliminated all the possible contributory factors with the exception of one. We are inclined to the opinion that the manner in which the castings are shaken out is responsible. You have omitted any reference to this detail. We do not know if the omission is intentional, or because it was not taken into account. If the castings are stripped while they are red hot, they certainly will warp, and the warp will be on the side that is most exposed to the atmosphere. If the copes are thrown off first, the ends of the castings will rise. However, if the drag is dumped immediately afterward, so that the under side of the casting is exposed, the casting end will pull down, that is in the opposite direction.

The fact that the long castings do not warp bears out this theory. In all probability the copes for the shorter bars are shaken out by two men who lift the copes without rapping, and throw them down. This leaves the upper side of the casting exposed to the cooling influence of the atmosphere. The long copes are too heavy to be handled in this manner. Therefore, they are rapped before they are lifted with the result that all the sand remains on the casting. If all the castings warped it might be necessary to leave them in the molds until they cooled, or alternatively, they might be shaken out shortly after they are poured and laid on parallel supports so that the air should have access to both sides.

Sometimes where shallow copes are employed, warpage is prevented by butting the sand all over after the casting is poured and then allowing the casting to remain in the clamped flask until it is cold. This remedy is based on the fact that the heat from the casting radiates faster from the shallow cope than it does from the drag. Therefore, the upper side of the casting cools first. Butting the sand makes it denser and the heat is retained for a longer period. The fact that the greater number of your castings are straight would seem to indicate that the design of the casting is not responsible. The same holds true for the temperature of the iron and the gating system. We suggest you look into the shakeout angle.

Wants Figure on Melting Cost

QUESTION Could you give us a rough estimate of present-day cost of molten foundry iron (per ton) in the ladle including no management or overhead charges? Assume that the cupola is of average size and that the charge is all scrap. Then at assumed unit costs for scrap, fuel, power, labor and cupola maintenance, what would be a rough figure at present for the molten metal in the ladle? Indicate the assumed cost of scrap so that it can be separated from the total.

ANSWER A breakdown of the cost of molten iron was included in an article by A. W. Gregg in the February, 1949 issue of FOUNDRY. The figures are based on a cupola melting 60 tons per day and are as follow:

	Cost per Ton Metal Melted
Coke @ $20 a net ton— ratio 6 to 1..	$3.33
Stone @ $3 a net Ton—100 lb per ton	.15
Power @ 1c Kwh—5 Kwh per ton	.05
Operating labor — 4 men @ $1.50 per hr.	.80
Refractory materials.	.50
Oil for heating ladles.	.10
Miscellaneous maintenance labor	.10
Soda ash @ 1.3c lb— 10 lb per ton	.13
Depreciation	.23
	$5.39

The above figure on refractory material consumption is somewhat at variance with those given by others. Carter in *Transactions,* American Foundrymen's Society, 1952, mentions firebrick patching, including material and labor, as $1.51 per ton, and for blown-in ganister as $1.10 per ton. Similarly, Wilke, *Transactions,* AFS, 1939 states that mud patching (clay and sand) costs $1.27 per ton for materials only.

It will be necessary, of course, to adjust the foregoing figures to current wage rates and material costs before adding to the total the cost of your metallic charge, in order to obtain an up-to-date average.

Could Melt Iron in Crucible

QUESTION Occasionally we get orders for small quantities of gray iron castings. We shall appreciate information on how to go about melting this metal in a small oil fired crucible pit furnace regularly employed for melting brass.

ANSWER With the one exception that the process will take a little longer you will experience no more trouble melting gray iron in a crucible furnace than in melting an equivalent amount of brass. Clean stove plate scrap probably will meet your requirement better than any other class of raw material. These castings originally are made from good quality iron. They expose a larger surface to the heat and thus facilitate melting. Also they are broken into small pieces so that they may be packed in a fairly compact mass in the crucible. Care must be observed not to pack them too tightly, otherwise the expansion may crack the pot. To avoid this contingency, also to expedite the melting, it is considered good practice to place a layer of charcoal between alternate 3 or 4 in. layers of iron. Crucible makers supply a special pot for melting steel and you probably would get better satisfaction by keeping one of these pots on hand for occasional gray iron heats instead of one of your regular brass crucibles.

Dips Pipes in Coal Tar Pitch

QUESTION We produce some cast iron pipe fittings ranging in size from 4 to 12 in. diam. These castings must be dipped in a protective tar coating material. We have tried dipping them cold in a heated roofing tar, but the mixture soon gets thick and chips off the castings. It is not satisfactory and it is too expensive. Can you give us the formula used in the regular pipe shops? Is the mixture heated? Are the pipes dipped hot or cold?

ANSWER Water pipe and fittings are heated to a temperature of 300°F and then dipped in a coal tar pitch bath maintained at the same temperature. They remain in the bath for two minutes, after which they are removed and allowed to drain. Standard specifications adopted by the American Society for Testing Materials for Cast Iron Soil Pipe and Fittings (A-74-42) follow: (a) When pipe or fittings are to be coated, coal tar pitch, varnish or an equivalent material shall be used unless otherwise specified. (b) The pitch shall contain sufficient oil to make a smooth coating. It shall be tough and tenacious when cold and not brittle nor shall it have any tendency to scale. (c) The temperature and composition of the pitch bath shall be so maintained as to provide the quality of coating for the castings as specified in paragraph (b). (d) Each casting shall be heated to a uniform temperature of about 300° F immediately before it is dipped and shall be at this temperature at the time it is put in the bath. It shall remain in the bath at least two min-

(*Concluded on page* 140)

Mr. E. A. Hartman
FOUNDRY SUPT. OF

Pangborn

SAYS:

"The Royer SAND HOG is indispensable"

"ELIMINATES 10 MAN-HOURS PER DAY!"

The SAND HOG, the Royer completely mechanized, self propelled, self loading sand conditioner has been in operation at the Pangborn Corp., Hagerstown, Md., for a full year. E. A. Hartman, Foundry Superintendent, says that "we consider it indispensable; we would not be without it." Formerly the 5-man night crew required 9½ to 10 hours to condition their sand. With the SAND HOG the same job is completed in 7 to 7½ hours. Not only has Pangborn eliminated a minimum of 10 hours of labor time per day but the night crew has time to do a more complete job of preparing the floors for the next day's operation.

Even more important to Pangborn, leader in the field of Blast Cleaning and Dust Control equipment, is the improvement in its already high quality castings and the big reduction in casting rejects. This is due chiefly to the removal of tramp iron and all contamination from the sand. Supt. Hartman further says that they are completely satisfied with the operation of the SAND HOG and believes the maintenance required is less than on former equipment.

Why don't you investigate the possibilities for this completely mechanized, easily maneuverable machine in *your* foundry? This hydraulically powered unit, operated by one man, eliminates costly sand handling and hauling and prepares from 40 to 60 tons per hour. Write for details.

Export Department, 306 W. Washington Blvd.
Chicago 6, Ill., U.S.A. Cable. ASMAN

Foremost in Sand ROYER *Conditioning Equipment*

ROYER FOUNDRY & MACHINE CO. 159 PRINGLE ST. KINGSTON, PA.

(*Concluded from page* 138)

utes. (e) Fresh pitch and oil shall be added when necessary to keep the mixture of the proper consistency and the vat shall be emptied of its contents and refilled with fresh pitch whenever the accumulation of sand or carbonaceous matter renders this desirable. (f) After being coated the pipe and fittings shall be carefully drained of all surplus pitch.

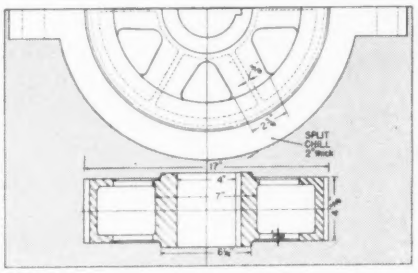
Blank Gear Cracks on the Rim

QUESTION Accompanying print is of a blank gear 17-in. OD, 4½-in. face, formerly a steel casting now produced in ductile iron. The outside vertical face is formed in a split chill 2 in. thick. The chill produces a sound casting, but we lose approximately 50 per cent of the castings through cracks in the area where the teeth are to be cut. Cores forming the inside of the casting collapse readily. The crack always appears where the two parts of the chill are bolted together. We have poured some of the castings with the half chills bolted. In other instances we have removed the bolts. We are thinking of reducing the chill thickness to 1 in. Your comment will be appreciated.

ANSWER Chilling one part of a casting always introduces a hazard on account of the time interval involved when one part of a casting cools before the remainder of the casting. The greater the difference in the time element, the greater the hazard. In some instances it is the main, while in others it may be one of a number of contributory factors.

In some instances the casting does not crack in the mold even when under intense strain, but will crack eventually if not subjected to an annealing process which relieves the strain. A familiar example is the cast iron car wheel. Cracks in chilled rolls have been traced to ill fitting joints between the chill sections which form the outside of the roll body. Cracks in the neck have been caused by fins at the joint line between the sand molded neck and the top chill. Many years ago the late T. D. West proved that certain chilled castings cracked when the mold was not set up perfectly level.

In our opinion, two or possibly three of the foregoing factors are responsible for the cracks in the chilled face of your small gear blank casting. Ductile iron may be classed as a first cousin of malleable iron and steel in its tendency to crack or tear while in the brief stage of passing from the liquid to the solid state. Even though bolted together and backed by rammed sand, the split chill will expand with the resulting slight opening at the joint. The slight ridge formed by metal entering the joint will prevent the wheel from contracting in a normal manner. Chill should be in one piece, machined on the inside face, painted with oil, shellac, blacking or the proprietary



Crack always appears in vicinity of joint between chill sections

chill coating material employed in car wheel foundries.

If the green sand in the cope and drag of the mold does not hug the chill closely, small thin fins will develop, especially on the top. These little fins also prevent easy and normal contraction of the casting. Finally, contraction may be and should be accelerated by poking out the hub core immediately after the casting has solidified.

Sand Properties Seem Opposed

QUESTION We would appreciate information regarding the technique of making molds using French sand.

ANSWER So far as we know French sand is handled like other molding sand except that the molds are dried or skin dried before molten metal is poured into them. French sand is highly prized by statuary and ornamental casting makers because it has certain attributes which are somewhat opposed. For example, it is fine-grain which provides a smooth surface, but also is quite permeable in the dry state. It also is high in clay. Sand usually is rammed quite hard—in fact statuary and ornamental molders ram it as "hard as a brick." The hard ramming and property of air setting in a short period permit pulling out drawbacks without sagging or slumping—a decided advantage in statuary making.

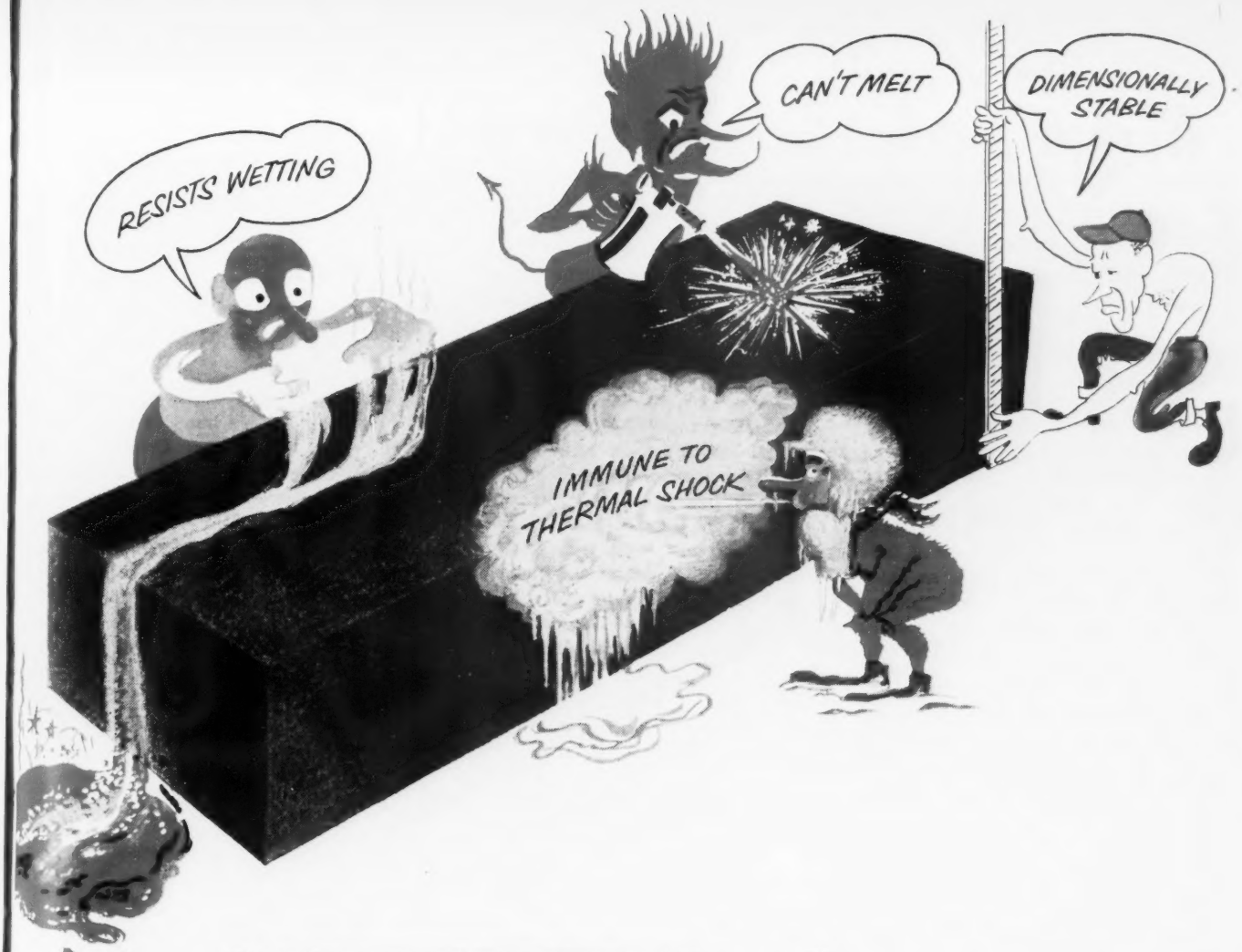
Core Has To Be Chiseled Out

QUESTION We are making aluminum alloy irrigation fittings for one of our customers, and are having considerable trouble obtaining a core formula suitable for the job. The cores we now make have to be chiseled out of the castings. We would like to have a core mix that would permit the cores to break down easily, and would like to know the quantities of sand, flour and oil to use. Could we reuse the old core sand to any advantage? Also we would like to know of a good flux to use on this job. We are using nitrogen at present. Castings must be pressure tight.

ANSWER If you had supplied us with information on your present core mix formulation with which you are having so much trouble, as well as the size of castings we might be able to be more specific on how to correct the difficulty. However, three possible reasons why the cores are so troublesome to remove are: Cores not baked through, use of too much binder, and employment of too much bank or clay-containing sand.

Our suggestion would be to reduce the binder materials to the minimum, using a clay-free silica sand—for example 100 parts of sand by volume, 1 part core oil and 1 part flour. Another suggestion is to use urea formaldehyde resin as the core binder. Detailed information on its application may be obtained from the various manufacturers advertising in FOUNDRY. Main essential is to make the cores as fragile as possible, but not so much so that the cores tend to break in handling.

Since nitrogen-gas fluxing serves well in removing gases from aluminum alloys, we wonder why you want to change, and suspect that your difficulty with lack of pressure tightness results from other causes. Possibly the nitrogen degassing is not conducted properly. Again it may be that the gating system could be improved. Third, but not least, the hard cores you mention do not help the situation.



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KEEP THESE STANDARD SIZES ON HAND FOR EMERGENCY!

13½" x 6" x 3" series
9" x 6" x 3" series
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If you think of carbon only in terms of complete furnace linings, check these other important locations in and around the furnace where "National" carbon brick and shapes will also save time and money as a maintenance refractory:

- ✓ ***RUNOUT TROUGHS***
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- ✓ ***CINDER NOTCH PLUGS***
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- ✓ ***SKIMMER PLATES***

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In Canada: National Carbon Limited, Montreal, Toronto, Winnipeg

Men of Industry

BERT J. AAMODT, for 10 years sales manager of Chicago works, National Malleable & Steel Castings Co., Cleveland, has been named assistant manager, Capitol Foundry Co., Phoenix, Ariz. In 1932 Mr. Aamodt joined National Malleable, owner of Capitol Foundry, and was superintendent of its Chicago steel foundry and later general superintendent. **John P. Kelleher,** assistant sales manager at Chicago works, has succeeded Mr. Aamodt there as sales manager. He has been with Chicago works since 1941 and active in sales work since the end of 1943.

♦ ♦ ♦

W. W. Kerlin has been appointed manager of service engineers, Meehanite Metal Corp., with headquarters in the New Rochelle, N. Y., offices. Since joining the company over 20 years ago Mr. Kerlin has been a member of the service staff operating from the Cleveland office. He was previously associated with Battelle Memorial Institute, Columbus, O.

♦ ♦ ♦

W. C. Mason, for the past 3 years executive vice president, Sterling Casting Corp., Bluffton, Ind., has been named general manager, Almont Mfg. Co., Imlay City, Mich. Mr. Mason was previously associated with Hall & Liles, consultants, Detroit, where he specialized in foundry management.

♦ ♦ ♦

Dr. L. I. Gilbertson has been appointed director in charge of the Murray Hill (N. J.), laboratories, Air Reduction Co., New York. He was formerly administrative manager there. **Dr. G. B. Carpenter,** formerly manager of the Murray Hill chemical division, has been made manager of the development staff with headquarters in New York. **Dr. A. Muller,** until recently manager of the metallurgical division, is now director of metallurgical research. **Dr. B. C. Redmon,** previously with U. S. Industrial Chemicals Co., has been appointed director of chemical research.

♦ ♦ ♦

F. W. Thayer has been named works manager in charge of foundry operations, Gunite Foundries Corp., Rockford, Ill., succeeding **C. B. Paden** who has retired following 40 years of service. Mr. Thayer, formerly assistant works manager, has been with Gunite over 7 years.

♦ ♦ ♦

Matthew A. Carpenter has been elected chairman of the executive committee, the Falk Corp., Milwaukee. **Harold F. Falk** has been made executive vice president, and **Louis W. Falk** has succeeded him as vice president-manufacturing. **Walter P. Schmitter** has been appointed vice president-chief engineer. **Richard S. Falk** has been made secretary, remaining assistant to the president.

♦ ♦ ♦

Frank Warga has been made general foundry foreman, AiResearch Mfg. Co., Los Angeles, where he will continue to have charge of the aluminum foundry at the main plant as well as the recently acquired steel foundry near South Pasadena, Calif.

♦ ♦ ♦

Harold E. Pridmore has moved to Palo Alto, Calif., where he will offer his services as foundry analyst to West coast foundries. Mr. Pridmore also will represent the Beardsley & Piper Division, Pettibone-Mulliken Corp., in northern California. His address is Box 137, Palo Alto.

♦ ♦ ♦

H. B. Oatley, formerly consumer vice chairman, has been elected chairman of the A-1 Committee on Steel, American Society for Testing Materials, succeeding **N. L. Mochel,** Westinghouse Electric Corp., Philadelphia, who has become senior vice president of the society. **T. G. Stitt,** Pittsburgh Steel Co., Allenport, Pa., has resigned as producer vice chairman of the committee. **W. F. Collins,** New York Central System, and **C. E. Loos,** U. S. Steel Corp., New

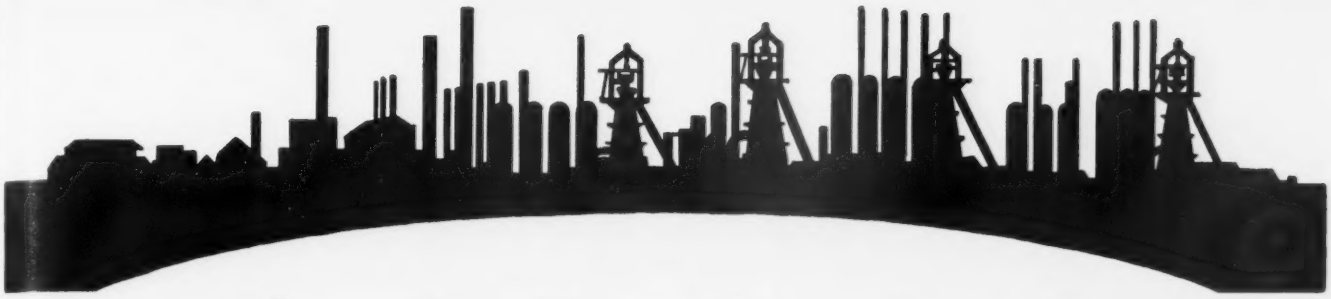
(*Continued on page* 144)

JOHN P. KELLEHER
. . . Malleable sales mgr.

BERT J. AAMODT
. . . with Capitol Foundry

W. W. KERLIN
. . . Meehanite service mgr.

W. C. MASON
. . . joins Almont Mfg. Co.



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Pig iron of the proper grade to suit the job is a must in good foundry practice.

Woodward Iron Company's cumulative experience in making pig iron over the past seventy years, coupled with its practice of constantly analyzing its raw materials and finished product, assures its customers that the analysis of their iron will fall uniformly within the established limits of the grade specified.

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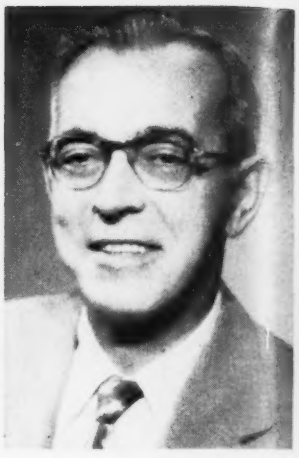
EDWARD G. MacLENNAN
. . . joins Bone Engineering

J. R. JOHNSTONE
. . . National Carbon sales

R. G. PENCE
. . . Rajac Equipment Sales



J. W. CLEVELAND
. . . foundry equipment sales

(*Continued from page* 142)

York, were elected consumer vice chairman and producer vice chairman, respectively.

♦ ♦ ♦

Edward G. MacLennan has joined Bone Engineering Corp., Glendale, Calif., in charge of electroformed metal ducting, aircraft parts and centrifugal investment casting. Mr. MacLennan was previously associated with Standard-Thomson Corp., Dayton, O., and Clifford Mfg. Co.

♦ ♦ ♦

Richard A. Flinn, recently associate professor at the University of Michigan, has been made professor of metallurgical engineering and production engineering there.

♦ ♦ ♦

Leroy J. Wieschhaus has been appointed Birmingham district manager, American Wheelabrator & Equipment Corp., Mishawaka, Ind. Mr. Wieschhaus has been in the Mishawaka office for 7 years as market research engineer, assistant sales promotion manager and recently abrasives engineer.

J. R. Johnstone has been named manager of the carbon products sales department, National Carbon Co., division of Union Carbide & Carbon Corp., New York. Mr. Johnstone was graduated from University of Illinois and since 1937 has been with National Carbon Co. in sales and administrative positions.

♦ ♦ ♦

Dallas F. Lunsford, elected chairman of the Central Indiana Chapter of the AFS for 1953-54, is chief metallurgist, Perfect Circle Corp., Hagerstown, Ind. Mr. Lunsford joined the company's foundry laboratory 20 years ago where he worked as technician, chemist and later assistant research metallurgist. In 1946 he became head of foundry melting operations and plant manager three years later. He served as vice chairman of Central Indiana Chapter in 1952-53.

♦ ♦ ♦

L. B. McKnight, executive vice president, Chain Belt Co., Milwaukee, has been elected president, succeeding **J. C. Merwin** who has become chairman of the board of directors. In 1927 Mr. McKnight joined Stearns Conveyor Co., Cleveland, which later became a Chain Belt subsidiary. He has held various executive positions and became a vice president-director in 1948.

♦ ♦ ♦

R. G. Pence, J. W. Cleveland, and **John T. Brown,** have organized the Rajac Equipment Sales Corp. for sale of foundry equipment in the midwest states, with headquarters at 4718 West Touhy Ave., Lincolnwood, Ill. Messrs. Pence and Cleveland have been in sales for 8 years with Hydro-Blast Corp., Chicago. Mr. Brown is a Chicago attorney.

♦ ♦ ♦

Walter A. Enstrom has been named manager of railroad track materials division, Pettibone Mulliken Corp., Chicago. He has been with the company 30 years.

♦ ♦ ♦

Carl L. Erwin, personnel manager, Edward Valves Inc., subsidiary of Rockwell Mfg. Co., East Chicago, Ind., has been named assistant works manager where he will continue to

(*Continued on page* 146)

LEROY J. WIESCHHAUS
. . . Wheelabrator manager

DALLAS F. LUNSFORD
. . . Central Indiana chairman

L. B. McKNIGHT
. . . president, Chain Belt Co.

CARL L. ERWIN
. . . assistant works mgr.

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GOOSE LAKE refractories have been used by leading foundries in the midwest area for over 40 years.

GOOSE LAKE FIRE CLAY BRICK are dry-pressed and de-aired assuring uniform dimensions and high density.

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ANOTHER **FOUNDRY PRODUCT!**

Grundite Bond Clay for bonding molding sands—a newly developed and different clay for malleable and many grey iron castings. Contains "Illite," an unusual, ceramic mineral.

ISRAEL SMITH
. . . heads Texas Chapter

D. W. WILSON
. . . Taylor Chain sales

ALBERT D. CARPENTER
. . . Hamilton Foundry sales

MANLY B. BROWN
. . . joins Great Lakes Carbon

(*Continued from page* 144)
take an active part in employment affairs and industrial relations. Mr. Erwin received a master's degree from University of Chicago in 1947 and prior to joining Edward Valves in 1951 was employment manager, Pullman Standard Car Mfg. Co., Chicago.

♦ ♦ ♦

Israel Smith, recently elected chairman of the Texas Chapter of the American Foundrymen's Society, is president, Western Foundry Co., Tyler, Tex. Mr. Smith was graduated from University of Texas in 1933 and engaged in the practice of law until 1946 when he joined Western Foundry, maker of cast iron soil pipe fittings, plumbing specialties and stove parts. Mr. Smith has served as treasurer and vice chairman of the Texas Chapter.

♦ ♦ ♦

Harold Oswald is president-treasurer, Oswald Refractories Co., 117 North Meramec St., St. Louis 5, recently organized to represent Alsey Brick & Tile Co., Alsey, Ill., Wellsville Fire Brick Co., Wellsville, Mo., and Vesuvius Crucible Co., Pittsburgh. For 20 years Mr. Oswald has been associated with Walsh Refractories Corp., St. Louis, where he was vice president, sales manager and director. **Harry C. Hampe,** formerly with Walsh Refractories, is vice president, Oswald Refractories Co.

♦ ♦ ♦

D. W. Wilson has joined S. G. Taylor Chain Co., Hammond, Ind., as eastern representative including Pennsylvania, New York, New Jersey, Maryland, Delaware, West Virginia and Ohio.

♦ ♦ ♦

Albert D. Carpenter has been appointed sales and service representative, Hamilton Foundry & Machine Co., Hamilton, O. Mr. Carpenter has been associated with the foundry industry in northern Ohio for 10 years.

♦ ♦ ♦

John T. Llewellyn, chairman of the board, Chicago Malleable Castings Co. and its subsidiary, Allied Steel Castings Co., Chicago, was recently honored at a luncheon by officers and staff members of the two companies on his 90th birthday anniversary. Mr. Llewellyn founded the malleable company 56 years ago and in 1917 Allied Castings was formed. His grandson, John T. Llewellyn II is president of the companies.

♦ ♦ ♦

Manly B. Brown has been elected vice president in charge of marketing, Great Lakes Carbon Corp., New York, with headquarters in the Chicago office. Mr. Brown has been with Republic Steel Corp., Cleveland, for 17 years, recently as sales manager of its pipe division.

♦ ♦ ♦

Leslie L. Hotsenpiller has been elected vice president-manufacturing, National Radiator Co., Johnstown, Pa. Mr. Hotsenpiller joined the company last year as director of manufacturing. Previously he was engaged in factory management work with North American Aviation Inc. and the airplane division of Curtiss-Wright Corp., in Columbus, O.

♦ ♦ ♦

Forrest R. Old, for two years assistant sales manager, has been appointed sales manager, Peninsular-

(*Continued on page* 148)

HAROLD OSWALD
. . . refractories agent

JOHN T. LLEWELLYN
. . . observes 90th birthday

LESLIE L. HOTSENPILLER
. . . v. p., National Radiator

FORREST R. OLD
. . . Peninsular sales mgr.

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Compatible as Smith L-O is with sand, we recognize that there are certain conditions in the field which require specialized attention. We suggest, therefore, that you call in a Smith representative . . . a man of broad experience who will study your equipment, procedures, and casting requirements and who will then recommend the grade of Smith L-O that is best suited to your particular conditions. Take advantage of his valuable assistance. You'll find his visit well worth *your* time!

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- ELTEX CHEMICAL COMPANY Houston 2, Texas
- FOUNDRIES MATERIALS CO. Coldwater, Michigan
- FOUNDRY SERVICE CO. Birmingham, Alabama
- F. F. SHORTSLEEVE Elmira, New York
- MALCOLM G. STEVENS Arlington, Massachusetts
- PACIFIC GRAPHITE CO., INC. Los Angeles 22, California
- ST. LOUIS COKE & FOUNDRY SUPPLY CO. *(formerly M. W. Warren Coke Co.)* St. Louis, Missouri
- WESTERN FOUNDRY SAND CO. Seattle, Washington
- WESTERN INDUSTRIAL SUPPLY CO. Portland 14, Oregon

Smith L-O Core Oil

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SMITH OIL & REFINING CO.

MANUFACTURERS OF L-O AND CERTIFIED CORE OILS
INDUSTRIAL OILS DIVISION • ROCKFORD, ILLINOIS

(*Continued from page* 146)

Grinding Wheel Co., Detroit. Mr. Old became Detroit sales representative in 1944 and later was assistant district manager in Cleveland.

♦ ♦ ♦

Gale Call has joined Buckeye Products Co., Cincinnati, as representative in eastern Ohio, western Pennsylvania, West Virginia and eastern Kentucky, with headquarters in Portsmouth, O., to handle sales of the company's line of foundry facings, supplies and core oils. Mr. Call attended Defiance College and was recently associated with Minnesota Pipe & Foundry Co., Anoka, Minn., and Dayton Steel Foundry Co.

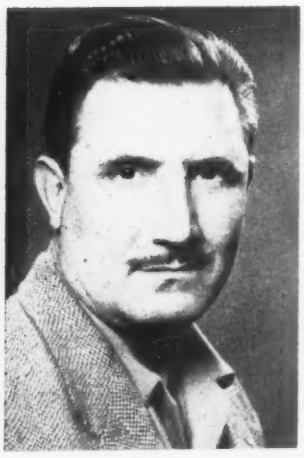
years service. **H. A. Johnson** has been assigned to south Texas territory formerly serviced by **S. E. H. France,** now transferred to New York sales. **R. D. Hulben** has been transferred to the Des Moines-Davenport, Iowa, territory, succeeding **H. W. McGarr,** now in Chicago district.

♦ ♦ ♦

Webb L. Kammerer, recently elected chairman of the St. Louis District Chapter of the AFS for 1953-54, is president, Midvale Mining & Mfg. Co., St. Louis. Mr. Kammerer entered the foundry industry following graduation from Washington University. He was a charter member of the St. Louis District Foundburgh. For the past year Mr. Coon has been manager of the High Point, N. C., plant of DeLuxe Saw & Tool Co., a Rockwell subsidiary. **George H. Medeska,** Chicago, formerly Cleveland district sales manager for Delta, has been named central division regional manager. **Walter H. Redpath,** Toronto district manager since 1940, has become Canadian division regional manager, and **George E. Rockwell,** New York, who has been in charge of Delta sales in New England for 5 years, is now eastern division regional manager.

♦ ♦ ♦

John A. Feola, elected chairman, Central New York Chapter of the American Foundrymen's Society, for



GALE CALL
. . . foundry products sales

VIRGIL E. SLATER
. . . sales mgr., Forker Corp.

WEBB L. KAMMERER
. . . heads St. Louis Chapter

JOHN A. FEOLA
. . . AFS chapter chairman

Virgil E. Slater has been appointed sales manager, Forker Corp., Cleveland. Until recently Mr. Slater was eastern manager, Industrial Crane & Hoist Corp., Chicago. Prior to that he operated Slater Engineering Co., St. Louis, a materials handling sales office.

♦ ♦ ♦

George H. Dennison has been appointed Buffalo district sales manager, Industrial Abrasive Sales Division, the Carborundum Co., Niagara Falls, N. Y., succeeding **George S. Rogers** who has retired following 37 years with the company. **M. I. Johnson** has been named Buffalo district sales engineer, succeeding **William T. O'Mara** who has retired after 41 years in that territory. **William G. Kettner Jr.** has been made office manager, New York sales district. **F. H. Garski Jr., A. G. Ott** and **J. H. Spehr** have been assigned to the Wisconsin territory formerly serviced by **C. R. Strong,** general salesman, Chicago district, who has been transferred to Peoria, Ill. **G. A. Tanner** has become general salesman in the St. Louis district, succeeding **Samuel Phipps** who has retired after 35

rymen's Club, which was founded 30 years ago and later became the St. Louis District Chapter.

♦ ♦ ♦

Robert H. Johnson has been appointed abrasive engineer in eastern Iowa for the Norton Co., Worcester, Mass., succeeding **Robert L. Schwaegerle** who has retired, following 25 years with the company. Mr. Johnson joined the company in 1941 as an apprentice and later an instructor in the grinding machine division. He has been in manufacturing control work since 1950.

♦ ♦ ♦

Wallace M. Kunkel and **Ross C. Stevens** have joined DeWalt Inc., Lancaster, Pa., subsidiary of American Machine & Foundry Co., New York, as district sales managers. Mr. Kunkel's territory will be that portion of New Jersey north of Trenton, and Mr. Stevens will cover Connecticut and the counties of Westchester and Putnam, New York.

♦ ♦ ♦

Byron Coon, Oakland, Calif., has been appointed regional manager of the western division, Delta Power Tool Division of Rockwell Mfg. Co., Pitts-

1953-54, since 1941 has been foreman of the nonferrous foundry, Crouse-Hinds Co., Syracuse, N. Y. Mr. Feola attended Syracuse University and joined Crouse-Hinds in 1923 as core department apprentice. He was transferred to the nonferrous foundry in 1925 and became assistant foreman in 1930. Mr. Feola was formerly treasurer and vice chairman of Central New York Chapter and is currently a member of the Sand Casting Committee, Light Metals Division of AFS.

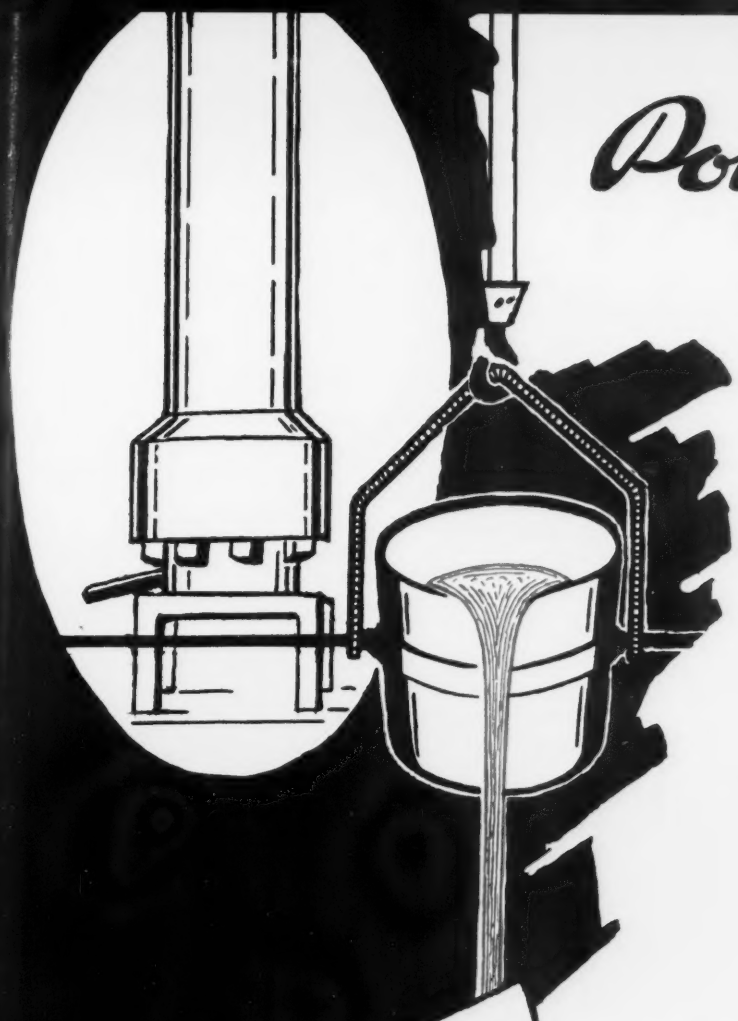
♦ ♦ ♦

Michael J. Vancheri has been appointed field engineer, the Bellows Co., Akron, O., with headquarters in Wilkinsburg, Pa. Other field engineers recently named to the territories mentioned by the Bellows company include the following: **Thomas J. Garfield,** Newark, N. J.; **William Hultgren,** New York; and **Daniel J. Rowan,** Providence, R. I.

♦ ♦ ♦

R. H. Fellows has been named manager of sales and engineering, Kilbourne & Jacobs Division, Wood

(*Continued on page* 150)



Pour CLEAN and HOTTER IRON — Better Castings!

When you see foundries with an amazingly small casting scrap pile, it's practically a sure bet that Famous Cornell Cupola Flux is used to cleanse and condition molten iron, make it more fluid and reduce sulphur.

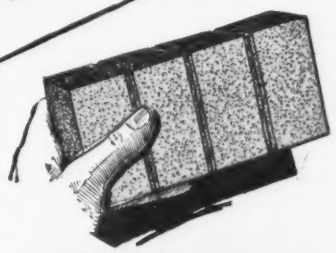
Famous Cornell Cupola Flux has built a reputation through more than 35 years' success in casting improvement. Why not use it in your foundry and profit by our outstanding achievement?

SCORED BRICK FORM ensures easy and most accurate use. Only a few seconds and practically no effort are required to lift Famous Cornell Cupola Flux from container and toss it into cupola with each ton charge of iron. Where charges are smaller, simply break off one to three briquettes (quarter sections) as per instructions.

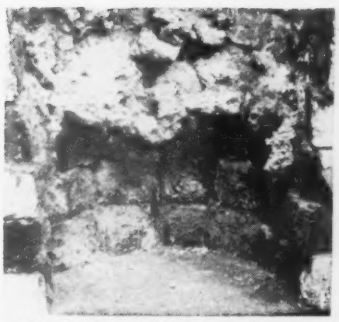
WRITE FOR BULLETIN NO. 46-B

Famous CORNELL CUPOLA FLUX

The low cost guarantee of better iron whether you operate a gray iron foundry or malleable foundry with cupolas.



SCORED BRICK FORM
(Approx. 4 pound brick)



THE CUPOLA before using Famous Cornell Cupola Flux.

THE CUPOLA during use of Famous Cornell Cupola Flux.

CLEANER CUPOLAS. LESS DOWN TIME FOR MAINTENANCE

Famous Cornell Cupola Flux ensures cleaner drops and practically eliminates bridging over. Furthermore, it forms a glazed or vitrified surface on cupola lining (brick or stone) — reducing erosion, patching and replacement.

The Cleveland Flux Co.

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FAMOUS CORNELL FLUXES
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BRASS FLUX

FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

ALUMINUM FLUX

FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.

(*Continued from page* 148)

Shovel & Tool Co., Columbus, O. Mr. Fellows was manager of sales and engineering, Kilbourne & Jacobs Mfg. Co., and prior to that was subcontract manager, Jeffrey Mfg. Co., Columbus, O. He has had more than 25 years of experience in the materials handling field.

♦ ♦ ♦

H. H. Zollar, formerly manager of sales, Shenango-Penn Mold Co.'s centrifugal castings division, Dover, O., has been named general manager, in charge of sales, plant operations and office management. Mr. Zollar joined the Dover plant 27 years ago.

♦ ♦ ♦

E. B. Meynard, since 1950 sales manager, Buckeye Tools Corp., Dayton, O., has been named general sales manager. Mr. Meynard, who joined

ROBERT V. SHAFFER
Buckeye Tool sales

the company in 1942, has served in numerous engineering and sales capacities. **Robert V. Shaffer,** who joined Buckeye in 1950 as special field representative, has been appointed field sales manager. He was previously associated with Dayton Steel Foundry Co., Dayton, O.

♦ ♦ ♦

Henry J. Fisher, Physical Metallurgy Division, Canadian Department of Mines and Technical Surveys, Ottawa, Ont., recently was awarded the degree of doctor of engineering by Yale University.

♦ ♦ ♦

C. V. Cooper, executive vice president, William F. Jobbins Inc., Aurora, Ill., subsidiary of Acme Aluminum Alloys Inc., Dayton, O., has been elected president, Aluminum Research Institute.

♦ ♦ ♦

E. G. Counselman has been appointed sales engineer, Machinery Division, Dravo Corp., Pittsburgh, with headquarters in the New York office. He will handle metropolitan New York sales. **D. H. Felix** has been appointed to the Chicago sales staff and **John Schuster,** to the Detroit sales staff of the Machinery Division. Mr. Felix joined the company over 3 years ago. Mr. Schuster formerly was in the company's Pittsburgh office.

♦ ♦ ♦

Henry C. Buckingham, since 1948 vice president in charge of plant operations, Thor Corp., Chicago, has become president, succeeding the late John R. Hurley. Mr. Buckingham joined the Thor company in 1935.

♦ ♦ ♦

Robert A. Epps, elected chairman of the Canton District Chapter of the American Foundrymen's Society for 1953-54, is technical sales representative, Stoller Chemical Co., Akron, O., which he joined 9 years ago. Mr. Epps was educated in the St. Louis schools and served a 3-year steel molding apprenticeship at American Steel Foundries, Granite City, Ill. Following 6 months as casting inspector at the East St. Louis plant, he became chief inspector at McKees Rocks, Pa., and was later transferred to the Alliance, O., plant where he was assistant chief inspector for 3 years and molding unit foreman and sand technician for 4 years. He joined Stoller Chemical 9 years ago.

ROBERT A. EPPS
. . . heads Canton Chapter

♦ ♦ ♦

Philip de Veau has been appointed Wisconsin sales engineer, Cleveland Quarries Co., Tiffin, O. He was previously manufacturer's agent, M. B. Austin Co., Northbrook, Ill.

♦ ♦ ♦

G. L. Smith, since 1946 sales manager, has been named general sales manager, Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, O. Mr. Smith joined Republic's sales department in 1923, was transferred to Youngstown in 1936 as assistant sales manager, and became traveling sales manager in 1945.

♦ ♦ ♦

William H. Miller, formerly associated with Bowser Inc., Terryville, Conn., as chief metallurgist of its technical refrigeration division, has been appointed sales engineer in the New England territory, Duraloy Co., Scottdale, Pa., with headquarters in New York.

♦ ♦ ♦

George R. Lundberg has been named sales manager, Brush Division, Osborn Mfg. Co., Cleveland. Mr. Lundberg joined the company 20 years ago and has held executive positions in the molding machine and brush divisions. **Frederic T. Turner,** formerly assistant sales manager,

GEORGE R. LUNDBERG
. . . Osborn Mfg. brush sales

has been named manager of market research. **Everett A. Sisson,** sales project supervisor has become assistant sales manager, **Alfred J. Chandler** manager of industrial sales and **C. A. Dolby,** manager of distributor sales. **Richard M. West,** formerly assistant advertising and sales promotion manager, has been made advertising manager.

♦ ♦ ♦

Dr. Jacob O. Kamm has been appointed vice president, Cleveland Quarries Co., Amherst, O., following resignation from Baldwin-Wallace College, where he was associate professor and chairman of the economics department. Dr. Kamm has been on the company's board of directors for some time.

♦ ♦ ♦

William J. Priestley, vice president-director, Union Carbide & Carbon Corp., New York, recently received the alumni award from the Alumni

(*Concluded on page* 152)

For rapid cleaning of Meehanite® castings, Fulton foundry uses CLECO Chippers

Fulton Foundry & Machine Company of Cleveland, Ohio, makes big Meehanite® castings for builders of heavy machinery. Cleaning these castings is a big job that can be most expensive unless the right tools are used.

That is why Fulton has selected Cleco Chippers. Workers like the fast action and easy handling. Management likes the high production and low maintenance costs.

Cleco Chippers save time and money cleaning all types of castings from cast iron to stainless steel — from magnesium to bronze. Ask for a demonstration in your plant — right away.

CLECO AIR TOOLS

PNEUMATIC DALLETT ACCESSORIES

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MICHIGAN: Detroit 21, 18071 Wyoming Ave. • **MISSOURI:** St. Louis 3, 2322 Locust Street • **NEW JERSEY:** Newark 4, 75 Lock Street
PENNSYLVANIA: Philadelphia 20, 5220 N. Fifth St.

In Canada: Cleco Pneumatic Tool Company of Canada, Ltd., 927 Millwood Road, Toronto (Leaside), Ontario
DISTRIBUTORS IN PRINCIPAL CITIES OF THE UNITED STATES AND THROUGHOUT THE WORLD

(*Concluded from page* 150)

Association of Lehigh University in recognition of extraordinary achievements, services, and leadership as well as in appreciation of his example to advancement of welfare and prestige to the college. Mr. Priestley was graduated from Lehigh University in 1908.

♦ ♦ ♦

Arnold Kraft, until recently foundry manager, Wilkening Mfg. Co., Philadelphia, has been appointed branch manager of the Linden, N. J., plant, Mather Spring Co., Toledo, O., maker of springs for trucks and passenger automobiles. Mr. Kraft was chairman of the Philadelphia Chapter of the AFS for the year 1952-53.

♦ ♦ ♦

H. Carl Sandberg, until recently associated with Frank C. Brown Co., management consultants, New York, has been appointed assistant general sales manager, Griswold Mfg. Co., Erie, Pa. **Dorothy M. Byers** has been named sales promotion director.

♦ ♦ ♦

Joseph Stein has joined Sam Tour & Co., New York, as supervisor of nondestructive testing. A graduate of University of Zurich, Mr. Stein has had broad experience with various phases of the atomic energy program.

♦ ♦ ♦

Jack L. Modrich, formerly sales manager, Miller Motor Co., Chicago, has been named general manager, Mechanical Air Controls Inc., Detroit. **Edward L. Rodgers** has been appointed chief engineer, and **Larry Newton,** purchasing agent.

♦ ♦ ♦

J. E. Smet has been named to manage the district office recently opened in Hartford, Conn., by Allis-Chalmers Mfg. Co.'s General Machinery Division, Milwaukee. **F. S. Howard** succeeds Mr. Smet as manager in New Haven, Conn.

Clyde R. Dean, assistant treasurer, Electric Steel Foundry Co., Portland, Oreg., has been elected president of the Portland Control of Controllers Institute of America. **R. G. Parks,** controller, National Malleable & Steel Castings Co., Cleveland, was re-elected a director of the local controllers' group there.

♦ ♦ ♦

Robert R. Denison, formerly contact metallurgist, Sheffield Steel Co., Houston, Tex., has been named research metallurgist, Armour Research Foundation, Illinois Institute of Technology. He is a graduate of Missouri School of Mines.

♦ ♦ ♦

Dr. Lawrence D. Schmidt has been appointed director of research, Semet-Solvay and Wilputte Coke Oven Divisions, Allied Chemical & Dye Corp., New York. succeeding **William Tiddy,** retired.

♦ ♦ ♦

F. H. Atwood, vice president-personnel and assistant chief counsel, Harbison-Walker Refractories Co., Pittsburgh, was recently elected president of the Refractories Institute, Pittsburgh. **W. A. Turner,** president, McLain Fire Brick Co., Pittsburgh, was re-elected treasurer.

♦ ♦ ♦

G. Phillip Scott has resigned as president, Eveready Briksaw Co., Chicago, to become a partner in the Robert G. Evans Co., Kansas City, Mo., organized last year for manufacture of saws and blades. Mr. Scott previously was vice president-general manager, Standard Steel Works, North Kansas City, Mo.

♦ ♦ ♦

A. J. Herrmann has been named vice president-sales and secretary, American Cast Iron Pipe Co., Birmingham, succeeding **Lester Long** who has retired following 38 years with the company. **J. W. MacKay** has succeeded Mr. Herrmann as assistant general sales manager.

FOREIGN VISITORS: Members of the French National Defense Aircraft Engine Productivity Team toured Cooper Alloy Foundry Co., Hillside, N. J., July 31 under the guidance of Herbert J. Cooper, executive vice president. Visit of the French team is part of the Mutual Security Agency program

Die Casting Institute To Mark 25th Year

The American Die Casting Institute, trade association of the die casting industry, will celebrate its 25th anniversary at its annual meeting, Sept. 16-17, at the Edgewater Beach Hotel, Chicago.

The meeting will feature business sessions on Wednesday morning, followed by a cost accounting panel reviewing the relationship of significant cost elements of producing aluminum die castings as opposed to zinc die castings. Members of the panel are: C. A. Stone, Stewart Die Casting Division; R. Bernhard, Doehler-Jarvis Division; Stanley Emerick, Precision Castings Co., Inc.; A. E. Gessner, Aluminum Co. of America.

The 25th anniversary banquet on Wednesday evening will be featured by a talk on "Die Casting and the Ammunition Business" by Brig. General Merle H. Davis, USA (Ret).

On Thursday morning a panel discussion will present the case for "ADCI Product Standards for Die Castings." W. J. During, executive vice president, Precision Castings Co., and A. T. Lillegren, vice president, Madison-Kipp Corp., will present a paper.

A second panel will deal with "The Future of Zinc in Die Castings," and Simon D. Strauss, vice president and sales manager of American Smelting & Refining Co., and Robert G. Kenly, vice president, the New Jersey Zinc Sales Co., will outline the position of the zinc producers.

Thursday afternoon will mark one of the highlights of the meeting when the annual meeting of the Die Casting Research Foundation Inc. will be held. The foundation was sponsored in 1951 by the institute to conduct basic and fundamental research in connection with the die casting of high-temperature alloys. The meeting will hear a review of present projects on "Die Materials for the Die Casting of Brass and High Temperature Alloys" and "A Study of Die Lubricants" now under active research for the foundation at Battelle Memorial Institute. Representatives of Battelle will participate in the discussions as will Prof. James L. Gregg of Cornell, the research co-ordinator of the foundation, and Dean Matthew A. Hunter of Rensselaer Polytechnic Institute, technical consultant to the foundation.

The institute was founded in 1928 by a group of 22 die casting companies and now has a membership of 89 companies who operate 101 die casting plants. Sixty-two companies have joined the research group

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ALMAG 35

ALUMINUM ALLOY

...for all applications requiring dimensional stability, tensile strength, ductility, corrosion and shock resistance.

As-cast, with no heat treatment or age hardening, Almag 35 possesses the only combination of properties in any light metal alloy which resulted in the establishment of military specification MIL-A-10935-6-7.

Almag 35 offers you 5 to 7 times greater Impact Resistance, 11-14% Elongation, and 37,000 to 40,000 lbs. per square inch Tensile Strength. It possesses the highest, most stable combination of strength, ductility, corrosion resistance, shock resistance, and dimensional stability of any aluminum alloy.

FOR THE FIRST TIME . . . all vital properties in one alloy, AS-CAST.

Send Prints for recommendation, before you specify **ANY ALLOY**

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WILLIAM F. JOBBINS INCORPORATED

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AURORA, ILLINOIS

John F. Schnur, Armour Research Foundation, instructs an apprentice at Tata Iron & Steel Co.

Explaining the merits of an atmospheric head and slag trap. Instruction is part of training course

Technical Aid Provided

FOUNDRIES OF INDIA

FOR more than a year a technical specialist from the United States has been in India assisting foundries of that country in improving the quality and volume of their production. He represents the International Division of Armour Research Foundation, Illinois Institute of Technology, Chicago.

Under the U. S. government's Point IV Program, the Office of International Trade of the Department of Commerce contracted with the Armour Research Foundation to fulfill certain specific requests from India and Pakistan for technical assistance in the industrial field. One of these projects covers foundry operations in India.

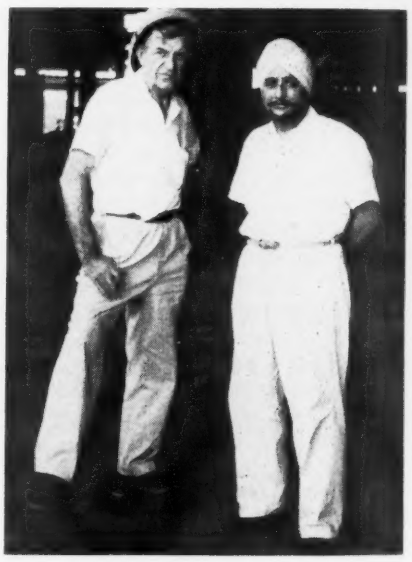
Armour's foundry specialist is John F. Schnur, a veteran foundryman with more than 30 years' experience in plant operation and personnel training; much of this time was spent abroad. Mr. Schnur arrived in India in March, 1952, and since then has visited numerous foundries, studying their problems and offering practical suggestions for improving their practice. His schedule was prepared by the Directorate General of Industry and Supply, Ministry of Commerce and Industry.

Casting facilities in India range from relatively modern to rather crude. Mechanized equipment is used in varying amounts at a number of foundries, but hand methods predominate. In addition, many small tools used by molders are poorly designed and inefficient.

The scope of Mr. Schnur's activities may be indicated by a condensed outline of his calls at a number of foundries in only one area.

Plant A—Demonstrated the use of green sand; advised against using the same sand for different metals, and demonstrated how to mix sand for nonferrous castings; instructed the workers in proper ramming procedures for large type fittings with which they were having considerable trouble due to shrinkage; made field trip to locate better molding sand; conferred with the foundry supervisors on general foundry problems.

Plant B—Submitted chemical analysis for heat-resistant castings, ingot molds, caustic pots and others; made recommendations for a gray iron having a high hardness and good machinability; made sketches for gates and risers; conducted an open discussion period with the supervisors.



Mr. Schnur and Manobar Singh Dua, foundry superintendent, Tata works

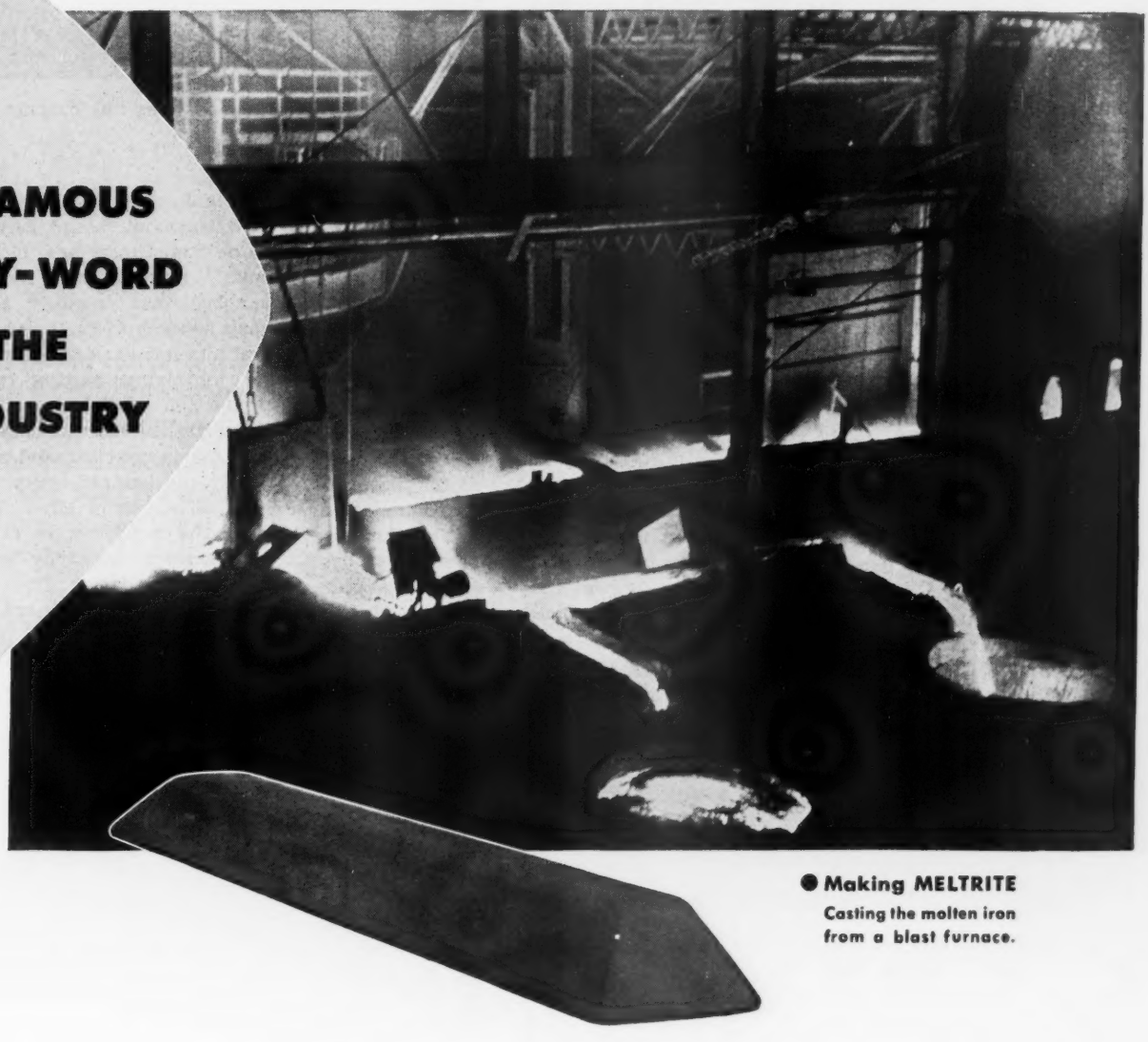
Plant C—The foundry submitted a prepared list of questions which the technologist, in a general conference, answered in detail. The questions covered a wide field, such as the preferred type of molding machine, what is the best type of core binder and how is it used, what sort of facing sand should be used, how can pinholes in aluminum castings be eliminated?

Plant D—Suggested changes to the gates on several patterns for malleable castings. These changes proved very successful.

Plant E—Help was given on vari-

MELTRITE
PIG IRON

A FAMOUS BUY-WORD IN THE INDUSTRY



● **Making MELTRITE**
Casting the molten iron from a blast furnace.

MORE USED THAN ANY OTHER MERCHANT PIG IRON

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70 years of service to industry

PICKANDS MATHER & COMPANY
UNION COMMERCE BUILDING • CLEVELAND 14, OHIO
CHICAGO • CINCINNATI • DETROIT • DULUTH • ERIE • GRAND RAPIDS
GREENSBORO • INDIANAPOLIS • MINNEAPOLIS • ST. LOUIS • WASHINGTON

IRON ORE • PIG IRON • COAL • COKE

Instructing workers to skim ladle before pouring

Lack of shoes or goggles does not concern workers

ous gating problems; instructions on molding and building proper flasks, formation of molding and core sand mixtures, gating of cast iron pipe; preparation of a technical paper on additional suggestions for cupola design and operation to raise temperature and improve melting conditions.

Plant F—Submitted mixtures for molding and core sand; made some changes on gates and risers; gave advice on cupola design to secure higher temperatures.

Plant G—Made sketches of different risers and gates, demonstrated proper core and molding sand mixtures; had a general discussion with the supervisors on foundry problems.

Plant H — Gave sand mixtures, flask drawings, slagging spout design and advised on cupola practice.

Plant I—The shop was having considerable difficulty with shrinkage. The technologist left several sketches for gates and risers; advised them on their melting practice for nonferrous metals.

A number of Indian foundries for years have followed the practice of using a hole in the floor for the drag half of a flask, even for patterns small enough to be accommodated in a 9 x 15-in. flask. The Foundation technologist has shown how use of a conventional two-part flask can increase production and improve casting quality.

Foundries have been instructed on redesigning of small tools, such as trowels, rammers and shovels. Rammers sometimes are merely large bolts. Shovels may have straight handles that require considerable back bending in their use. The general aim has been to point out means for improving casting quality and production under prevailing conditions, rather than attempting major changes in practice and adoption of highly mechanized equipment.

Effectiveness of Mr. Schnur's work with the foundries is confirmed in comments received by Armour Research Foundation from managers of plants he has visited. The following are typical:

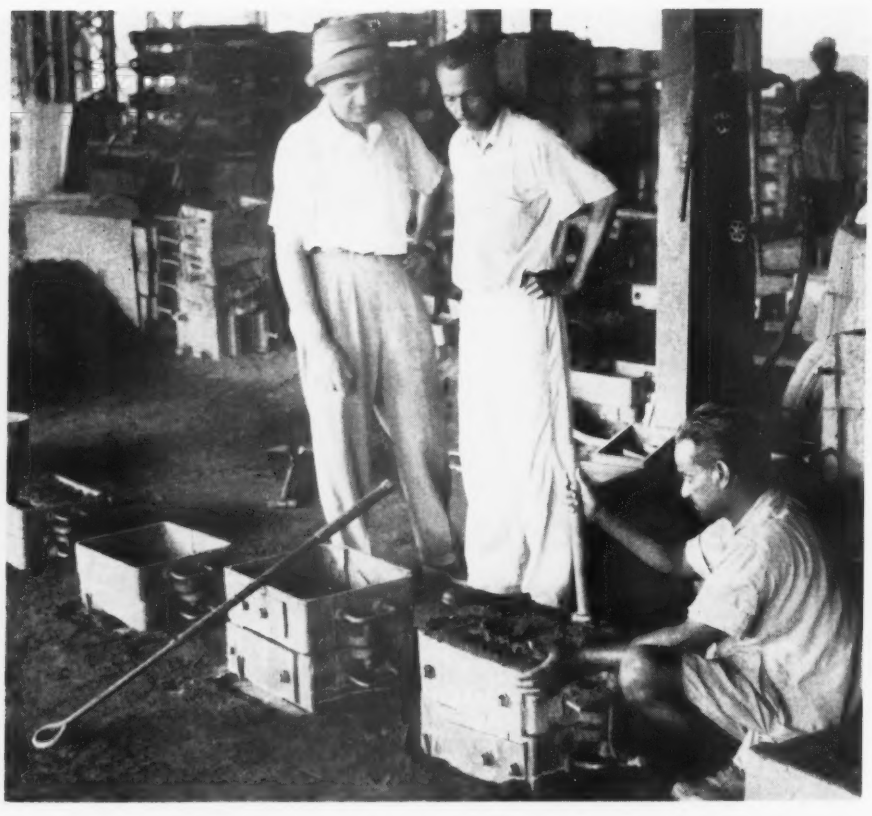
"We are in a region where there is absolutely no good foundry sand and we had been in considerable difficulty about it. Mr. Schnur solved this for us by working out a sand mixture which has given very good results."

"We have no hesitation in saying that some of the methods followed by us in the foundry were rather old and crude. Mr. Schnur's guidance has helped us in taking to more modern practices which will go a long way in improving our quality as well as production."

"Mr. Schnur's deep knowledge and wide experience in foundry technology have been of considerable value in tackling our foundry problems.

"His valuable suggestions for improvements worked magic and have been highly appreciated by the workers whose quality of production in general has wonderfully improved."

It is realized, of course, that only a start can be made toward large-scale modernization of Indian foundry practice by these short, though effective, visits. What is needed is a continuing program, and it is believed that the success of these initial efforts will probably result in the establishment of a foundry methods demonstration and training center, the first of its kind in India.



Some small tools, such as these hand rammers, are ineffective

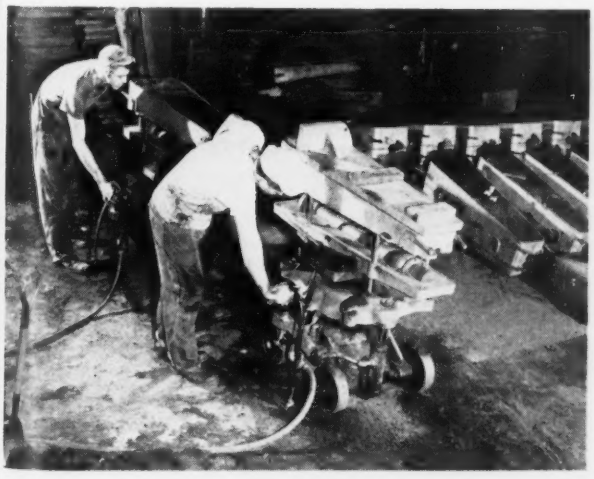
Make your Molding Machine Dollars go further with

Trouble-free performance over a longer period of time is the objective behind Davenport Molding Machine engineering.

Davenport Molding Machines always have been recognized for their longer life and lower maintenance costs.

Davenport engineers will welcome an opportunity to discuss your molding problems with you . . . at your convenience.

Write us today for complete descriptive literature.



Cope and Drag Molds being made on a Davenport 24 AJS Jolt Pin Lift.

DAVENPORT MACHINE AND Foundry Company
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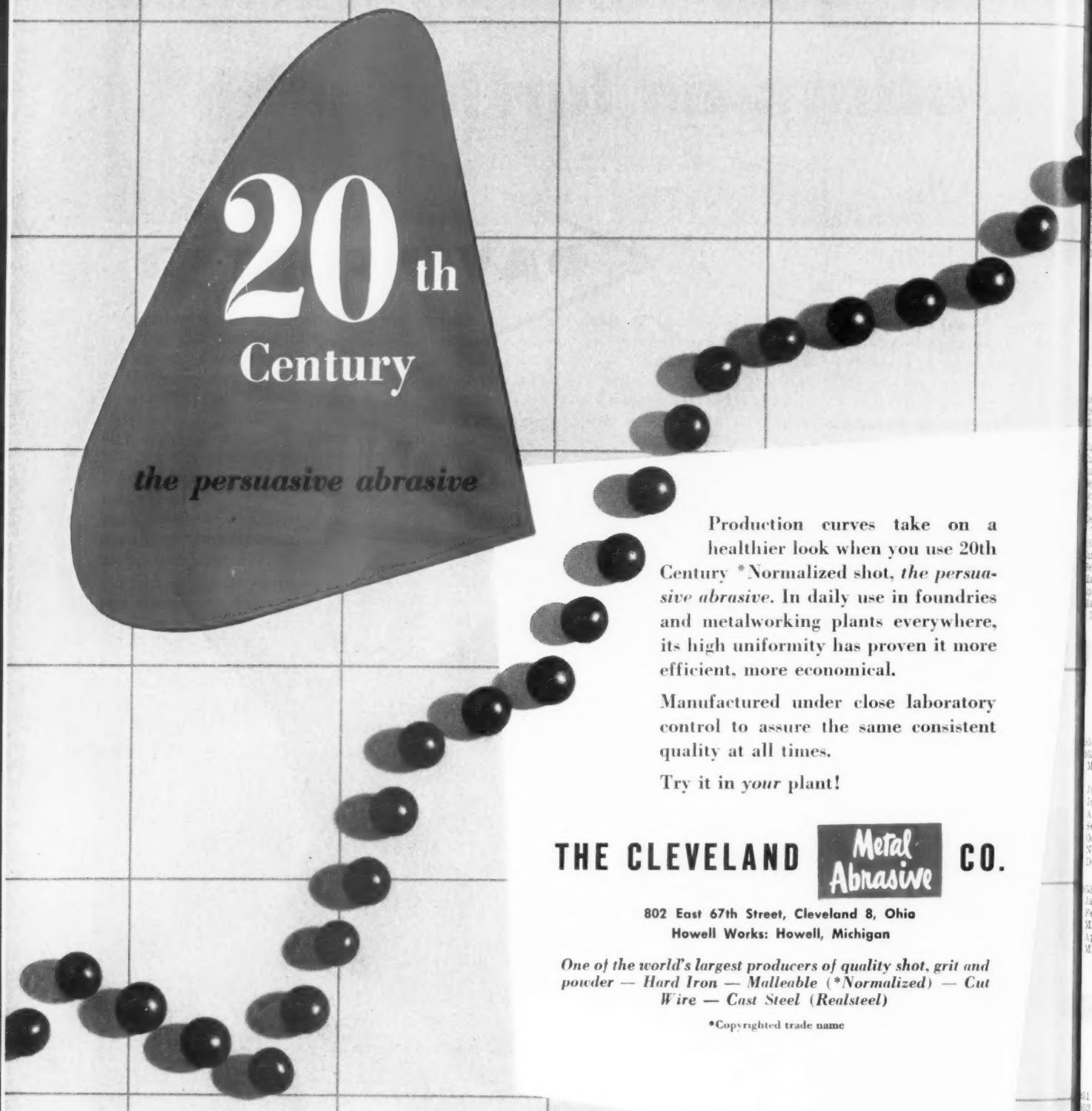
Ph. Bonvillain & E. Ronceray, Choisy-Le-Roi, Rue Paul Carle, Seine, France



Production curves take on a healthier look when you use 20th Century *Normalized shot, *the persuasive abrasive*. In daily use in foundries and metalworking plants everywhere, its high uniformity has proven it more efficient, more economical.

Manufactured under close laboratory control to assure the same consistent quality at all times.

Try it in *your* plant!

THE CLEVELAND Metal Abrasive CO.

802 East 67th Street, Cleveland 8, Ohio
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*One of the world's largest producers of quality shot, grit and powder — Hard Iron — Malleable (*Normalized) — Cut Wire — Cast Steel (Realsteel)*

*Copyrighted trade name

Foundry Statistics

Malleable Iron

(Shipments of castings—net tons[1])

	Shipments		
	Total	For Sale	Unfilled Orders[2]
1951	1,085,241	656,076	.....
1952			
May	81,770	51,476	180,382
5 mo.	421,901	262,014	.....
June	74,446	46,511	173,353
July	45,266	29,675	166,517
Aug.	63,716	39,308	162,832
Sept.	75,950	45,849	168,367
Oct.	88,062	52,922	168,609
Nov.	76,099	46,708	167,842
Dec.	80,680	50,485	173,494
Total	926,120	573,472	.....
1953			
Jan.	87,249	53,272	174,809
Feb.	86,515	51,963	175,088
Mar.	94,481	57,025	177,776
Apr.	95,923	57,757	174,514
May	82,050	48,011	160,387
5 mo.	446,218	268,028	.....

Aluminum

(Shipments of castings—1000 pounds[1])

	Shipments				
	Total	Sand	Perm. Mold	Die	Unfilled Orders[3]
1951	515,131	193,378	160,011	151,465	.....
1952[3]					
May	42,094	15,984	12,297	12,717	105,284
5 mo.	207,753	81,524	59,543	62,892	.....
June	39,867	15,989	10,255	12,657	108,213
July	35,275	14,014	9,232	11,302	111,518
Aug.	39,197	15,834	10,493	11,730	117,648
Sept.	45,430	16,733	12,515	15,888	127,777
Oct.	51,631	17,826	15,191	18,284	132,624
Nov.	46,483	15,419	13,463	17,372	138,461
Dec.	53,343	17,277	16,191	19,608	146,499
Total	518,979	194,616	146,883	169,732	.....
1953[3]					
Jan.	55,629	19,158	16,147	20,052	142,542
Feb.	54,864	17,583	16,698	20,272	148,557
Mar.	59,423	18,989	17,865	22,255	145,749
Apr.	61,582	20,009	18,583	22,620	141,231
May	57,602	19,600	16,479	21,208	138,037
5 mo.	289,100	95,339	85,772	106,407	.....

Copper-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments			
	Total	Sand	Perm. Mold	Unfilled Orders[3]
1951	1,197,443	1,075,437	69,883	.....
1952[3]				
May	83,401	75,072	5,458	83,355
5 mo.	438,012	393,446	29,212	.....
June	76,768	69,014	4,906	84,363
July	66,177	60,249	3,669	89,662
Aug.	78,798	71,273	5,154	89,310
Sept.	85,815	78,278	4,680	89,034
Oct.	93,102	84,544	5,518	86,779
Nov.	80,439	72,281	5,011	82,393
Dec.	90,799	81,777	5,715	76,871
Total	1,009,910	910,862	63,865	.....
1953[3]				
Jan.	85,781	76,686	5,388	80,793
Feb.	85,183	76,847	5,061	76,578
Mar.	92,798	83,639	5,716	69,490
Apr.	94,362	85,471	5,462	72,291
May	85,223	76,912	4,855	66,926
5 mo.	443,347	399,555	26,482	.....

Magnesium

(Shipments of castings—1000 pounds[1])

	Shipments		
	Total	For Sale	Unfilled Orders[3]
1951	30,825	28,090	.....
1952[3]			
May	2,734	2,607	14,163
5 mo.	14,862	14,005	.....
June	2,703	2,603	13,132
July	2,405	2,303	14,052
Aug.	2,478	2,390	14,288
Sept.	3,090	2,949	16,833
Oct.	3,250	3,070	16,237
Nov.	2,959	2,785	17,053
Dec.	3,110	2,872	16,020
Total	34,857	32,977	.....
1953[3]			
Jan.	3,073	2,825	15,680
Feb.	3,225	3,033	14,834
Mar.	3,362	3,093	13,608
Apr.	3,294	3,046	12,709
May	2,679	2,434	13,635
5 mo.	15,633	14,431	.....

Foundry Production Workers

Estimated Number

	May 1953	Apr. 1953	May 1952
Ferrous	.....	223,900	238,900
Nonferrous	.....	82,000	94,300

Average Weekly Earnings

Gray Iron	$75.26	$76.96	$68.80
Malleable Iron	78.25	78.50	71.18
Steel	80.16	81.73	76.97
Nonferrous	80.56	80.75	74.97

Average Weekly Hours

Gray Iron	40.9	41.6	40.0
Malleable Iron	41.4	41.1	39.7
Steel	40.9	41.7	42.5
Nonferrous	41.1	41.2	40.7

Labor Turnover Rate (Apr.)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	4.0	5.0	3.2	1.0
Malleable Iron	4.3	5.0	3.6	0.5
Steel	3.4	3.9	2.7	0.4
Nonferrous	5.5	8.0	3.8	2.4

Source: Bureau of Labor Statistics

Gray Iron Castings—Shipments

(net tons[1])

	All Castings Total	All Castings For Sale	Miscellaneous Castings Total	Miscellaneous Castings For Sale	Heavy Steel Ingot Molds Total	Heavy Steel Ingot Molds For Sale	Chilled Railroad Car Wheels Total	Pressure Pipe & Fittings Total[4]	Soil Pipe & Fittings Total[4]	Unfilled Orders[3]
1951	14,988,555	8,453,048	9,573,347	4,471,539	2,614,517	1,257,542	639,996	1,473,192	687,503	.....
1952										
May	1,100,630	624,430	698,332	317,150	186,998	91,980	44,229	117,586	53,485	1,459,305
5 mo.	5,831,876	3,304,070	3,673,710	1,707,454	1,065,557	504,007	254,253	584,756	248,081	.....
June	835,263	502,322	616,895	292,846	19,467	10,575	44,066	103,335	51,500	1,445,521
July	636,423	431,889	407,757	227,794	14,794	10,223	40,783	96,784	56,305	1,409,684
Aug.	1,001,629	602,025	596,369	295,861	198,856	99,760	35,606	108,313	62,485	1,513,166
Sept.	1,119,373	629,708	676,732	309,299	230,219	107,987	39,912	107,847	64,663	1,450,723
Oct.	1,233,480	688,837	759,131	340,695	243,462	117,255	45,664	117,089	68,134	1,391,609
Nov.	1,060,735	593,779	649,316	296,674	218,349	104,035	41,655	99,196	52,219	1,309,252
Dec.	1,141,658	619,070	713,332	321,939	247,605	116,410	42,957	95,198	42,566	1,316,308
Total	12,860,437	7,371,700	8,113,242	3,792,562	2,238,309	1,070,252	544,896	1,312,518	651,472	.....
1953										
Jan.	1,161,945	622,392	730,216	324,330	252,181	118,514	38,385	93,930	47,233	1,333,255
Feb.	1,135,868	607,160	721,847	315,101	228,360	106,398	44,420	93,152	48,089	1,332,038
Mar.	1,264,271	674,720	800,390	341,656	250,447	119,630	41,414	114,885	57,135	1,375,886
Apr.	1,277,288	683,047	799,872	329,802	246,873	122,702	44,877	120,105	65,561	1,305,849
May	1,185,545	641,581	734,326	312,836	238,202	115,728	41,373	113,136	58,508	1,271,711
5 mo.	6,024,917	3,228,900	3,786,651	1,533,725	1,216,063	582,972	210,469	535,208	276,526	.....

Steel Castings—Shipments

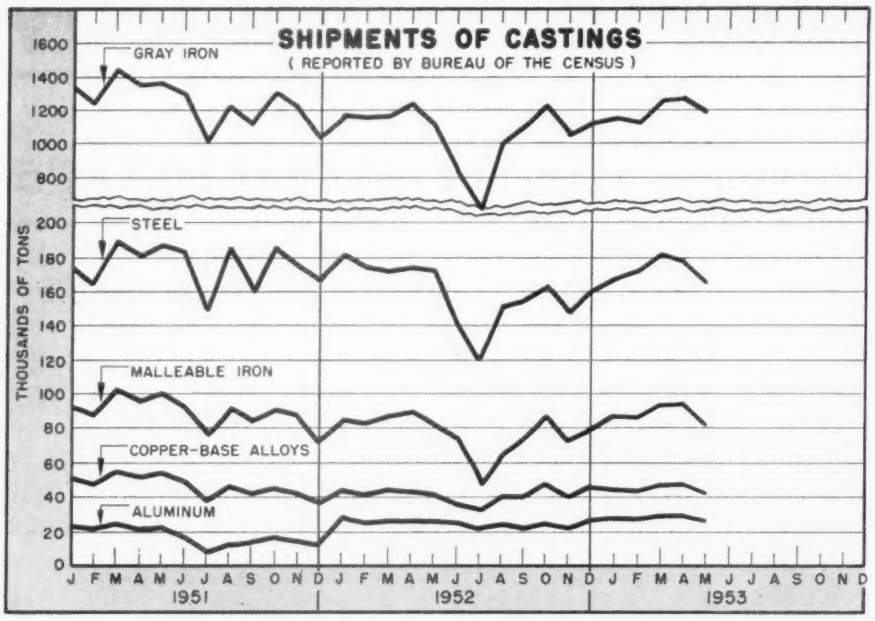
(Net tons[1])

	All Castings Total	All Castings For Sale	All Castings Railway Specialties	Carbon Steel Total	Carbon Steel For Sale	Carbon Steel Railway Specialties	Alloy Steel Total	Alloy Steel For Sale	Alloy Steel Railway Specialties	Unfilled Orders[3]
1951	2,050,054	1,506,903	466,172	1,541,280	1,162,687	415,915	508,574	344,216	50,157	.....
1952										
May	173,635	132,129	35,227	125,309	95,816	30,995	48,326	37,129	4,232	804,695
5 mo.	880,768	671,541	169,704	639,183	486,000	148,632	243,575	187,426	21,072	.....
June	141,628	114,410	30,455	101,850	84,388	26,815	39,778	30,818	3,640	846,459
July	119,036	97,633	20,752	81,576	67,600	18,694	37,460	30,329	2,058	855,046
Aug.	150,232	113,997	24,498	107,203	81,123	21,626	43,029	33,359	2,872	809,354
Sept.	158,392	121,402	20,686	109,011	82,968	17,843	49,381	39,190	2,843	781,929
Oct.	165,155	124,626	23,590	116,201	87,035	20,611	48,954	38,571	2,979	772,949
Nov.	148,259	110,467	23,148	105,314	77,979	20,681	42,945	33,349	2,467	751,687
Dec.	161,733	122,166	26,728	114,146	86,165	24,046	47,587	36,757	2,682	719,203
Total	1,925,203	1,476,242	339,561	1,372,494	1,053,264	298,948	552,709	430,429	40,613	.....
1953										
Jan.	167,211	126,819	27,150	118,423	118,423	24,788	48,788	38,121	2,362	706,490
Feb.	175,675	137,592	33,156	122,624	94,991	29,828	53,051	43,495	3,328	644,302
Mar	182,181	141,873	34,364	129,055	100,069	31,772	53,126	42,286	2,592	634,600
Apr	179,615	140,051	34,035	128,457	99,602	31,212	51,158	40,938	2,823	573,565
May	165,649	126,380	29,552	117,318	88,781	26,888	48,331	38,036	2,664	196,047
5 mo.	870,331	672,715	158,257	615,877	501,866	144,488	254,454	202,876	13,769	.....

[1] Source: Bureau of Census. [2] For sale only. [3] Based on new sampling method; not comparable to prior figures. [4] Cast iron pipe is shipped for sale.

(Concluded on page 160)

FOUNDRY STATISTICS *(Concluded from page 159)*



Index of Foundry Equipment Orders

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1952	1953
Jan.	404.5	301.0
Feb.	200.4	257.3
Mar.	310.0	396.7
Apr.	385.1	303.0
May	225.2	294.4
June	373.8	446.8
July	343.9	...
Aug.	311.6	...
Sept.	365.9	...
Oct.	335.8	...
Nov.	258.1	...
Dec.	343.3	...

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Coke Production and Consumption

(Net tons)

	Production	Consumption Total	Consumption By Foundries
1951	79,133,744	78,868,124	3,664,404
1952			
June	2,472,940	1,772,203	219,906
6 mo.	34,191,040	33,009,448	1,498,884
July	2,376,019	1,621,308	166,377
Aug.	6,039,749	6,204,539	232,249
Sept.	6,180,804	6,517,682	269,029
Oct.	6,449,519	6,792,273	276,427
Nov.	6,316,660	6,418,639	252,805
Dec.	6,690,649	6,981,036	246,107
Total	68,244,440*	67,876,964	2,955,241
1953			
Jan.	6,767,814	6,884,585	248,557
Feb.	6,132,084	6,263,083	237,670
Mar.	6,835,310	6,875,568	275,442
Apr.	6,538,477	6,536,195	272,229
May	6,820,985	6,748,957	274,236
June	6,612,338	6,671,585	255,096
6 mo.	39,707,008	39,979,973	1,563,194

Ingot Brass & Bronze

(Shipments in net tons)

	1952	1953
Jan.	28,315	24,423
Feb.	24,211	25,429
Mar.	23,890	28,256
Apr.	22,547	25,044
May	21,740	21,660
June	21,274	20,818
July	18,947	.....
Aug.	21,807	.....
Sept.	22,770	.....
Oct.	25,811	.....
Nov.	23,441	.....
Dec.	22,983	.....
Total for year	277,736	.....

Zinc-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments—Totals	Shipments—For Sale	Unfilled Orders[2]
1951	478,996	324,964	.....
1952[3]			
May	33,325	22,246	74,805
5 mo.	170,445	117,174	.....
June	31,449	21,255	73,290
12 mo.	408,353	282,673	.....
1953[3]			
Jan.	45,941	30,702	88,440
Feb.	46,583	31,761	91,800
Mar.	51,673	35,460	90,266
Apr.	51,456	34,674	91,874
May	44,471	29,403	85,234
5 mo.	240,124	162,000	.....

Pig Iron Production and Consumption

	Production** (Standard grades—1000 net tons) Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace, 1000 gross tons) Total	Cupola	Air	Electric
1951	70,264.5	3,186.2	3,169.0	55,134.1	8,774.8	63,760	5,731	354	136
1952									
June	1,043.2	133.7	103.1	758.6	47.7	991	342	20	5
6 mo.	29,514.7	1,351.5	1,377.9	23,189.2	3,561.2	26,671	2,540	158	53
July	981.6	119.7	118.3	712.9	30.7	845	250	12	8
Aug.	5,767.3	262.9	280.6	4,553.8	669.9	5,063	423	9	8
Sept.	6,069.3	294.7	306.6	4,757.0	710.9	5,363	417	21	9
Oct.	6,415.3	280.0	299.4	5,091.6	744.2	5,812	463	24	9
Nov.	6,138.9	262.0	315.4	4,842.6	718.8	5,472	397	21	12
Dec.	6,414.7	293.4	315.1	5,106.9	699.2	5,685	419	24	14
Total	61,306.8	2,864.2	3,013.3	48,254.0	7,174.9	54,911	4,909	269	113
1953									
Jan.	6,470.6	274.9	285.5	5,201.5	708.8	5,784	425	24	12
Feb.	5,802.6	187.0	294.6	3,640.7	680.3	5,027	418	24	14
Mar.	6,601.1	263.9	358.1	5,256.1	723.0	5,873	466	27	14
Apr.	6,161.6	244.7	327.1	4,885.6	704.2	5,568	478	28	12
May	6,508.5	210.0	347.7	5,237.0	713.8	.....	.....	.....	.....
June	6,288.0	201.6	313.4	5,075.0	698.0	.....	.....	.....	.....
6 mo.	37,832.4	1,382.1	1,926.4	30,295.9	4,228.1	.....	.....	.....	.....

Iron and Steel Scrap Consumption

(Gross tons*)

	All Scrap Total	All Scrap Purchased	By Types of Furnace: Cupola Total	Cupola Purchased	Air Total	Air Purchased	Electric Total	Electric Purchased
1951	68,518,208	33,822,431	11,090,607	5,878,939	1,203,740	441,099	8,391,919	5,389,000
1952								
Apr.	5,360,417	2,657,926	834,066	440,035	106,059	38,888	684,318	427,330
4 mo.	22,682,463	11,008,808	3,261,415	1,725,102	394,921	147,587	2,866,663	1,812,930
May	5,369,258	2,660,471	779,436	404,899	94,597	35,966	700,617	455,466
June	2,048,951	1,169,102	719,739	374,127	82,357	30,412	285,596	173,740
July	1,965,007	1,156,296	524,651	278,750	52,999	19,733	364,536	244,944
Aug.	5,470,696	2,738,593	721,255	348,181	74,351	28,091	682,405	446,540
Sept.	5,782,986	2,862,994	760,092	389,910	82,212	30,493	761,795	501,600
Oct.	6,256,031	3,066,041	851,458	439,401	98,947	37,743	814,565	546,180
Nov.	5,960,435	2,885,008	731,825	379,950	80,228	30,502	780,042	518,320
Dec.	6,089,722	2,973,633	804,275	412,177	92,621	35,064	758,845	491,080
Total	61,625,549	30,520,946	9,154,146	4,752,497	1,053,233	395,591	8,015,064	5,190,830
1953								
Jan.	6,256,718	3,061,551	810,254	413,971	95,430	35,695	795,292	517,940
Feb.	5,802,854	2,817,896	818,375	422,306	92,371	35,234	745,179	478,480
Mar.	6,536,867	3,211,476	901,786	464,110	103,034	38,583	857,760	563,480
Apr.	6,227,089	3,026,533	921,589	474,185	106,449	41,004	820,647	531,560
4 mo.	24,823,528	12,117,456	3,452,004	1,774,566	397,286	150,516	3,218,878	2,091,440

*Source: U. S. Dept. of Interior. Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only. [3]Based on new sampling method; not comparable to prior figures.

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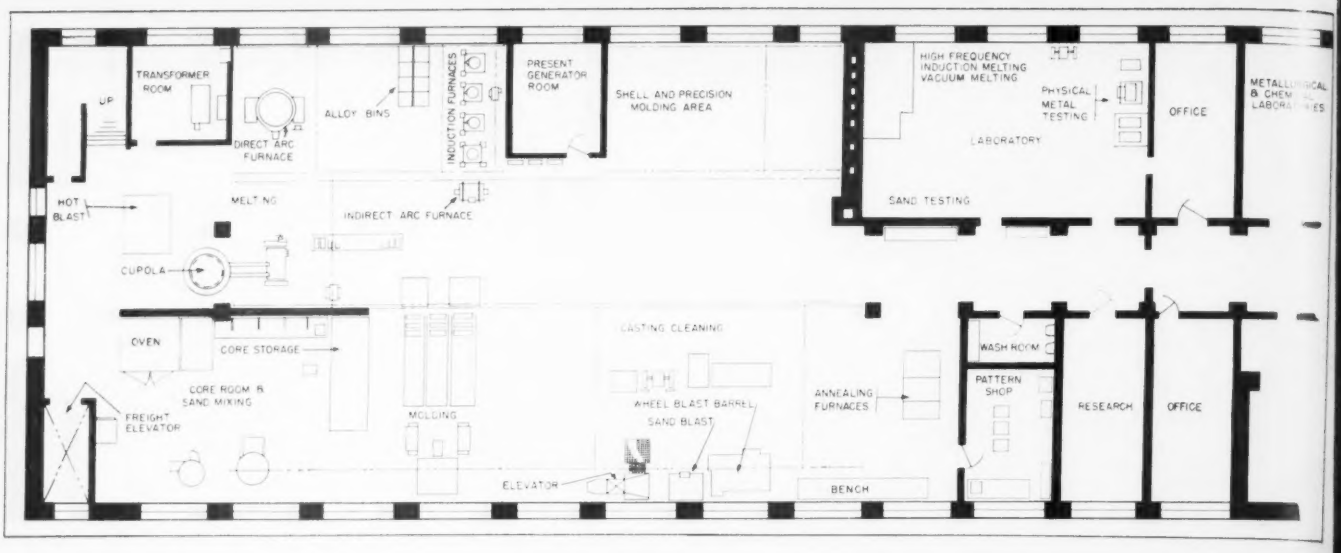

Layout of Cast Metals Laboratory at the University of Michigan

There's a New Relationship between

CAST METALS

and the

UNIVERSITY

By RICHARD A. FLINN
Professor of Metallurgical and Production Engineering
University of Michigan
Ann Arbor, Mich.

IT is usually a refreshing shock to the foundry executive to learn the new objectives of the cast metals laboratory in a modern engineering school. The engineering graduates of 1900-1945 generally remember the foundry as a sort of shop course where they learned to pound black sand, get dirty and dodge hot metal.

The instructors were often expected to pinch hit for maintenance men, to mold and replace a considerable tonnage of broken and worn metal parts. The equipment was fit only for the Smithsonian Institution, being both antique and dangerous to operate. The foundry, far from a good place to work, was an even poorer place to study.

We believe the class of 1955 will remember the cast metals laboratory in a different light. Some of the metallurgists will look back on the foundry courses as their first application of the principles of physical chemistry and physical metallurgy to the processing of useful parts. The production engineers will recall the flexibility of the casting process in the design of components. Industrial engineers will perhaps review the casting method as unique in converting raw materials to finished product in a few hours.

Many of these men will have spent a maximum of their spare time in the laboratory contributing to basic research problems or to professional development projects. The class of 1955 will look back upon the cast metals laboratory, therefore, as a base where new ideas in the melting, refining and casting of metals can be tested safely, easily and with modern equipment. In short, the foundry will be remembered as a fertile place to study, to probe, to investigate, yes, even to work.

What is producing this drastic change? New buildings and new equipment do not of themselves cause change. Men do.

The most potent factor has been the definition of a new criterion of an engineering educator. The complete engineering professor is no longer a bushy-haired, eccentric character who can speak only in five-syllable words or in terms of Bessel functions. He has not one but three modern standards to meet, and these merit analysis here because upon their fulfillment rests the entire cast metals program.

1. The professor must be a good teacher above all. He must not only have the required knowledge but be adept at communicating it. The laboratory rather than the lecture hall is an ideal place for this process. Few engineers earn their living in a lecture hall; most work in a plant. Once basic theory has been mastered, therefore, the laboratory with pilot scale as well as research equipment provides an excellent environment for the student to learn to live and produce in an engineering situation.

2. The teacher should make independent contributions to engineering knowledge. Since engineering is an art and a science, these may take the form of radically new techniques or consist of publications in the basic sciences of chemistry, physics or mathematics. By contributing to engineering knowledge, the instructor is able to provide those first-hand illustrations that sound the note of conviction in teaching.

3. The instructor should be a qualified professional man. The engineering graduate used to receive this greeting from industry: "All right, let's forget that theoretical stuff and be practical now that we have to make dollars." Although the primary function of the engineering educa-

(*Continued on page* 164)

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(*Continued from page* 162)

tion is to provide a deep foundation in the basic sciences, the student should be given an introduction to the application of these tools before entering industry. What better material can be offered than the first-hand experiences of his teacher in modern industrial problems?

Our cast metals program has been balanced, therefore, with those three objectives in mind—teaching, research and professional development. For the development of the student and teacher are not separate but really simultaneous processes. While the program is not yet completed, we may describe what has been done under each objective in orienting courses, staff, equipment and space.

Teaching — Formal instruction is offered at the University of Michigan at two levels, and individual research problems, including the Ph. D. thesis, are available. The elementary courses are provided for production, metallurgical and industrial engineers, respectively, and involve about 200 students a year. While the specialized material depends upon the field of the student, a basic quantitative approach to cast metals is used in every case. It is pointed out that, regardless of size or product, certain operations are common to all foundries. These are melting, molding and finishing. Accordingly a series of intensive experiments in each group is conducted in the laboratory. In melting, for example, the shrinkage, fluidity, degasification and solidification characteristics of steel, cast iron and nonferrous metals are studied. Different furnaces are employed to illustrate the salient operating features of each.

Under molding, the student progresses from hand floor molding through the use of various molding machines, coremaking and finally to the study of shell and investment molding. In the category of finishing, the essentials of cleaning, inspection and metallurgical quality control are developed. Modern tools such as x-ray and cobalt 60 radiography, metallographic, magnetic and fluorescent particle inspection are employed.

Finally, after ten weeks of separate study of the operations, the student takes different positions for three weeks as part of a production team to produce quality castings for use in the metal cutting courses. Here he learns of the importance of timing and alignment of objectives in production work.

The advanced course, Cast Metals in Engineering Design, is available to graduate students and seniors with the prerequisites in foundry and metallurgy. In the first half semester the properties of the important ferrous and nonferrous alloys are explored by melting, testing and metallographic examination. Supplementary material on wear, heat and corrosion resistance is added so that the student obtains a thorough understanding of the engineering properties of the important cast metals. In the second portion of the course critical castings are studied in a variety of industries including automotive, aircraft, mining, chemical, machine tool and ordnance.

The research courses vary according to the student from problems requiring six hours a week to full-time doctoral research. These problems are part of the general research program.

Research — Research produces the new blood of any industry—new materials and methods. The rebirth of the cast metals industry in the last 15 years has resulted not from increased mechanization and improved efficiency alone but from the application of the basic sciences to cast metals. The new methods of casting by shell and investment molding, the new alloys such as ductile iron, heat and corrosion resistant steels and the light-weight aluminum and magnesium structures are typical examples.

The university laboratory has a great responsibility in this development. The most valuable asset in research is fresh, imaginative thinking and the greatest untapped source is in the minds of properly prepared students. To put this to work it is important to select one main objective for a given interval and to weed out all the petty digressions with which any foundry is plagued. We have chosen the field of melting, including the reactions in the different melting furnaces, slag-metal-gas equilibria, and the effects of ladle treatments on subsequent solidification mechanisms. The foundry groups at other universities have decided upon intensive work in sand, others in foundry costs. We believe this specialization in research is important to effect any real advances, otherwise a group becomes merely a jack of all trades, master of none.

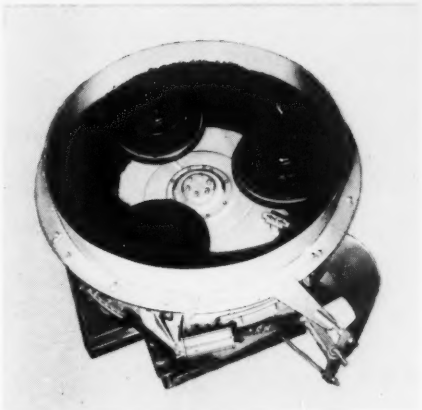
Professional Work—Many educators have led a happy life putting all their energy into teaching. Others have viewed teaching as a necessary evil and concentrated on basic research. To balance teaching and research and then add professional work does not merely add another third; it is closer to adding a third ball for a novice juggler. Why do it? Why should not academic personnel stay in school instead of competing with commercial testing and industrial research laboratories?

The answer is that they should not compete. We believe it is a waste of engineering talent and space to per-

(*Continued on page* 167)

"So—You office guys get a ten o'clock coffee break—Why can't we?"

How does the SPEEDMULLOR cut maintenance costs?



A truly modern machine, designed to give maximum mulling with minimum maintenance.

Foundry maintenance is a major problem. The careful foundry equipment buyer checks maintenance features carefully before purchasing a mullor. The careful mullor manufacturer builds these features into his machines.

Look at the maintenance cost cutting features of the Speedmullor. It is designed to save you money not only when installed but for years and years after that.

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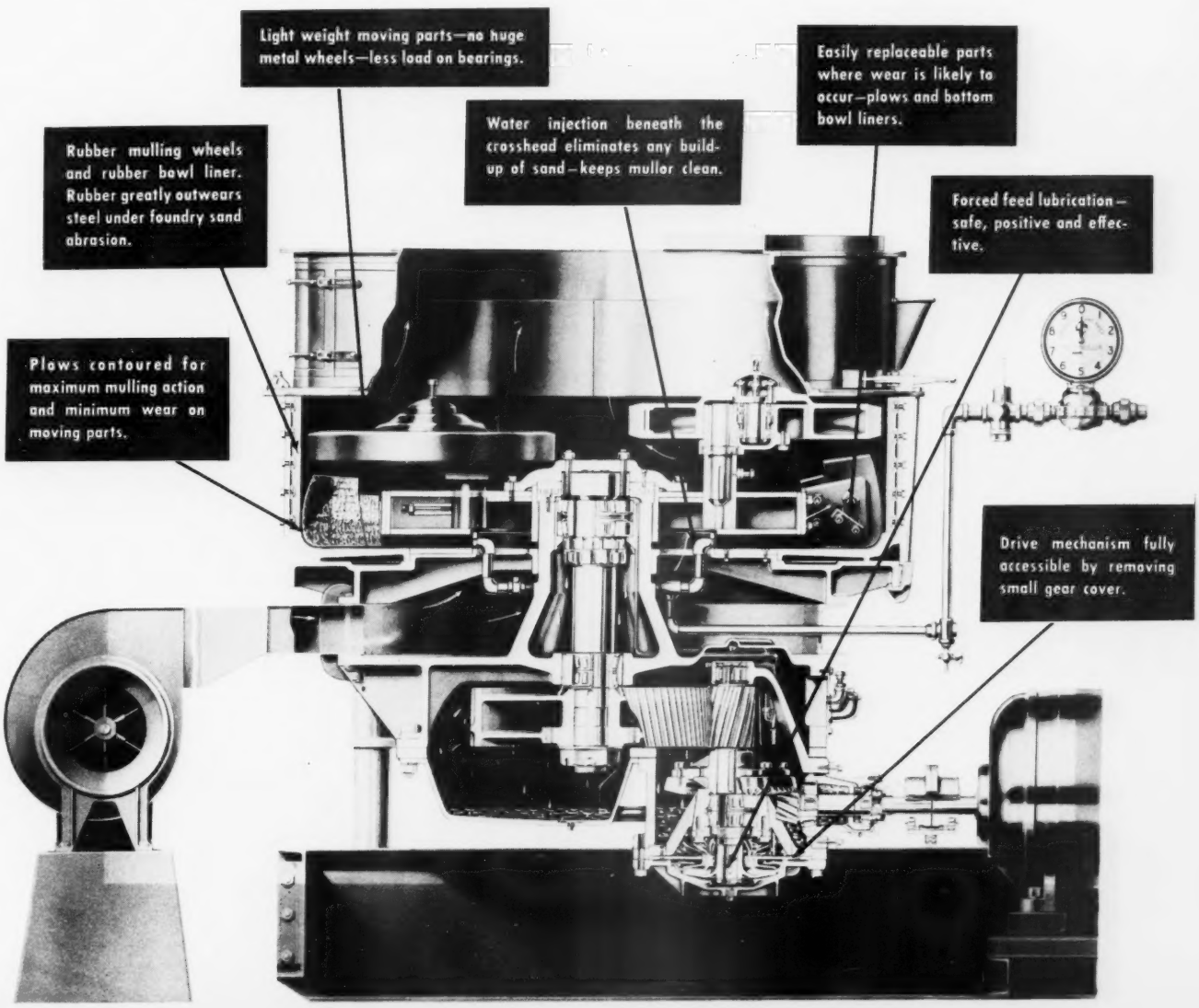

Light weight moving parts—no huge metal wheels—less load on bearings.
Easily replaceable parts where wear is likely to occur—plows and bottom bowl liners.
Water injection beneath the crosshead eliminates any build-up of sand—keeps mullor clean.
Rubber mulling wheels and rubber bowl liner. Rubber greatly outwears steel under foundry sand abrasion.
Forced feed lubrication—safe, positive and effective.
Plows contoured for maximum mulling action and minimum wear on moving parts.
Drive mechanism fully accessible by removing small gear cover.

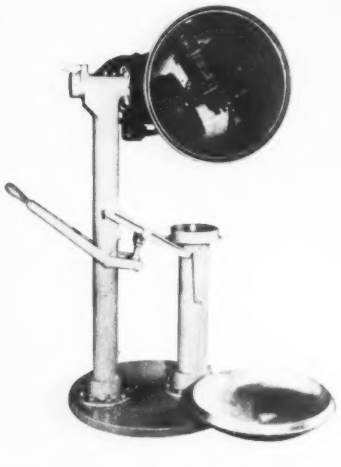
Easier to use
Easier to clean

The LAB MULBARO

SPECIFICALLY DESIGNED FOR SAND LAB USE

Only the Beardsley and Piper Mulbaro is specifically designed for use in a foundry sand laboratory. Its removable mulling bowl may be carried to a lab bench or out into the foundry for loading, and several bowls can be used with one Lab Mulbaro. After mulling, the bowl may be carried to another part of the lab for sand testing.

The advantages of scientific rubber-tired mulling with spring-loading (by the originator of spring loading) are yours with the Lab Mulbaro too. The mulling bowl is contoured for maximum mulling efficiency. This inexpensive laboratory tool will permit exact control of your molding and core sand properties.



Tilting mulling mechanism and removable mulling bowl make the Lab Mulbaro the ideal foundry tool . . . easy to use, easy to clean.

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(*Continued from page* 164)

form routine work such as simple chemical analyses or tensile tests as an end in themselves at the university. There are enough really professional problems, particularly those of a long-range nature, which are difficult to justify in a commercial laboratory. The key here, as in research, is to select a related group of problems even at the risk of shocking the people who believe a professor should know something about everything.

A balanced diet of professional work provides another very important element, the stimulation of ideas for basic research. Sir Isaac Newton made his critical examination of gravitational phenomena in an apple orchard, but in modern times a more fertile ground has been the industrial plant or laboratory. It is difficult for an alert engineer to visit a new plant without returning with new ideas for basic research. The engineer in industry often has to shelve these in favor of more pressing problems, but the academic group can explore them without restriction. By this close relation with industry, university personnel can develop a stockpile of research material for eager student consumption rather than be hunting through ancient and valueless data to grind out just one more routine publication.

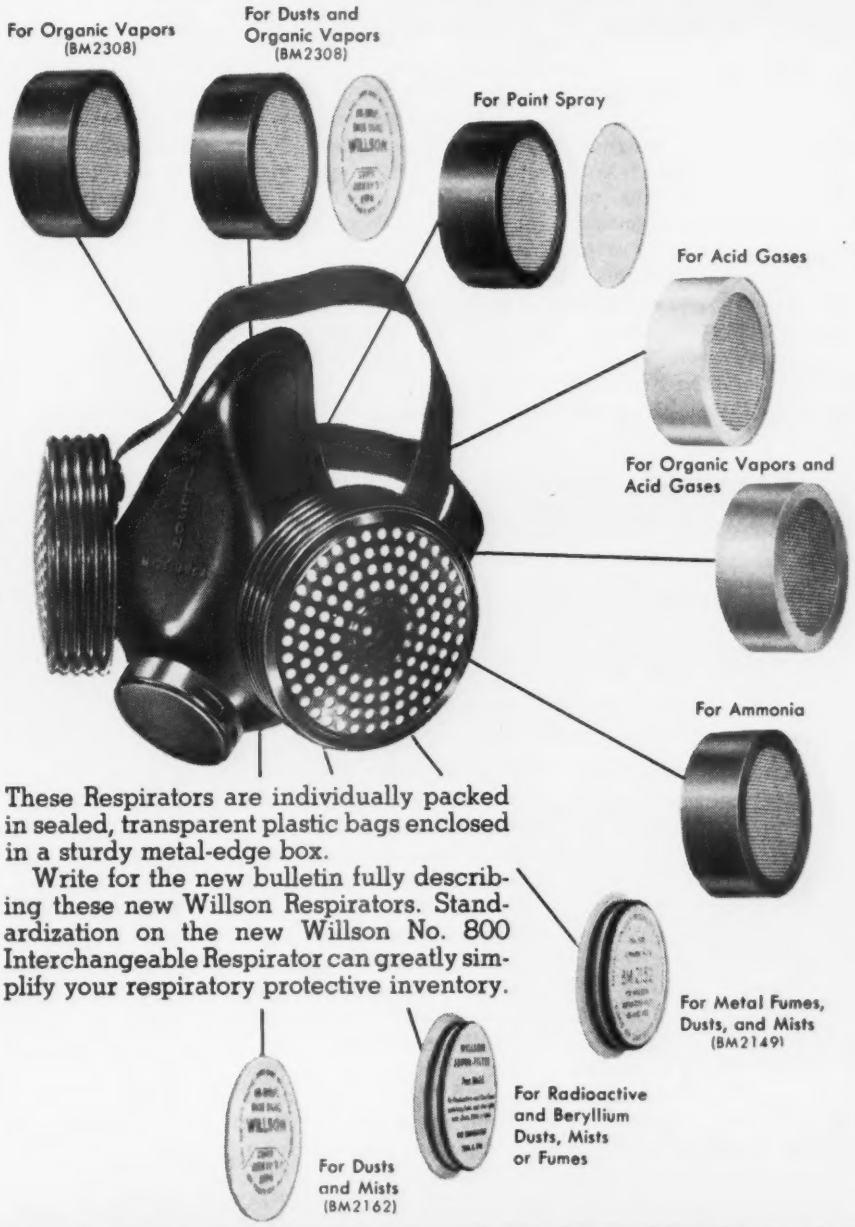
To accelerate this process of cross fertilization we have embarked upon a program of close co-operation with industry as exemplified by the special summer course for industrial personnel in "Advanced Cast Metal Practice" offered Aug. 10-20, 1953. A small group was provided all-day instruction in the laboratory and with lecture and problem sessions. The first four days covered the physics and mechanics of liquid metals under the headings of fluidity, risering, gating and solidification. The fourth to eighth days reviewed the recent contributions of chemistry to understanding and controlling deoxidation, degasification and sulphur and phosphorus removal. The last two days were devoted to a review of latest developments in materials and methods based on the discussions of the previous days and included basic cupola operation, magnesium-treated cast iron, shell molding, titanium alloys. Lecturers were invited from industry as well as from the universities.

Equipment — Another example of industry-university co-operation is the rebuilding of the cast metals laboratory with the assistance of the local Foundry Educational Foundation Advisory Committee under the chairmanship of F. J. Walls.

As shown in the accompanying drawing, developed with the aid of

NEW **WILLSON** Interchangeable Respirator

First truly interchangeable respirator. Requires no additional parts or accessories to use any one of the cartridges, filters, or combinations shown.


For Organic Vapors (BM2308)
For Dusts and Organic Vapors (BM2308)
For Paint Spray
For Acid Gases
For Organic Vapors and Acid Gases
For Ammonia
For Metal Fumes, Dusts, and Mists (BM2149)
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These Respirators are individually packed in sealed, transparent plastic bags enclosed in a sturdy metal-edge box.

Write for the new bulletin fully describing these new Willson Respirators. Standardization on the new Willson No. 800 Interchangeable Respirator can greatly simplify your respiratory protective inventory.

More than 300 Safety Products Carry This Famous Trademark

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Established 1870

WILLSON PRODUCTS, INC., 237 Washington Street, Reading, Pennsylvania

Giffels & Vallet Inc., Detroit, this laboratory has been designed with both formal teaching and research in mind. The equipment for the unit operations of melting, molding and finishing has been consolidated. Sand flows in a straight line from the bins to the mixers, then to the molding stations and finally to pouring and shakeout and return. The metal handling progresses from the melting area to pouring, shakeout, cleaning and inspection.

The rearrangement of equipment has resulted in freeing a large bay for research on a pilot scale in new methods. Additional induction melting facilities have permitted simultaneous classroom instruction on the main floor and research in the smaller laboratory. One of the most stimulating parts of this development has been the co-operation of outstanding men from both foundries and equipment manufacturers. Important participants have included:

American Brake Shoe Co., Apex Foundry Co., Atlas Foundry Co., Auto Specialties Mfg. Co., Beardsley & Piper Division, Claude B. Schneible Co., Eaton Mfg. Co., Foundry Equipment Co., Giffels & Vallet Inc., King Seeley Corp., Lindberg Engineering Co., National Engineering Co., Newaygo Engineering Co., Redford Iron & Equipment Co., Simplicity Engineering Co., Frederic B. Stevens Inc., Warner R. Thompson Co.

The program is reaching its final stages; the missing major items of equipment include: 1000-lb, 375kva direct arc furnace, vacuum melting equipment, cupola auxiliary equipment (preheater, water cooled tuyeres, etc.), sand conveyor and bins, and a crane system.

Summary and Conclusions—We have prepared this progress report of the cast metals laboratory at the University of Michigan at the request of our FEF Industrial Advisory Committee to acquaint industry with our objectives and our needs. We realize our success will be measured just as the success of any industry—in the quality of our product. In our case, our most important product is not castings but men. As these young engineers take their places in the cast metals industry we will soon find whether we have been successful.

Book Review

Ferrous Analysis, by E. C. Piggott, cloth, 690 pages, 6 x 9 in., published by John Wiley & Sons Inc., New York. Price $12.50.

The present volume is the second edition of this work, which originally was published in 1942 under the title *The Chemical Analysis of Ferrous Alloys and Foundry Materials*. It now is subtitled "Modern Practice and Theory."

The author's original policy of basing the various methods of analysis on the possible presence of common and uncommon interfering elements is continued, particularly in the interests of specificity and range of application, because it seemed more advantageous than any other, even though not without faults. The work has been revised, enlarged and otherwise brought up to date. It is meant for analysts and advanced students.

How To Do It . . .

Automatic Machine Grinds Skim Cores at High Production Rate

By ROBERT H. HERRMANN
Associate Editor

GRINDING of 3000 skim cores per hour is made possible by a device developed by Leo Rice, pattern shop general foreman, International Harvester Co., Indianapolis. Basic machine in the unit is a standard vertical drill press with a horizontally revolving grinding disk about 6 in. diam mounted on the spindle. Beneath the grinding disk a steel table 22 in. diam revolves, also in a horizontal plane, at 3⅓-rpm. Power to rotate the steel table is supplied by V-belt from a gear box reducer unit mounted at the power take-off of the drill press motor.

The steel table has fifteen 2¼-in.-diam cavities located at uniform centers in the face of the plate near its peripheral edge. Skim cores are placed in the cavities by hand and, as they are rotated under the grinder, approximately 1/16-in. is ground off the top surface, removing fins and other irregularities.

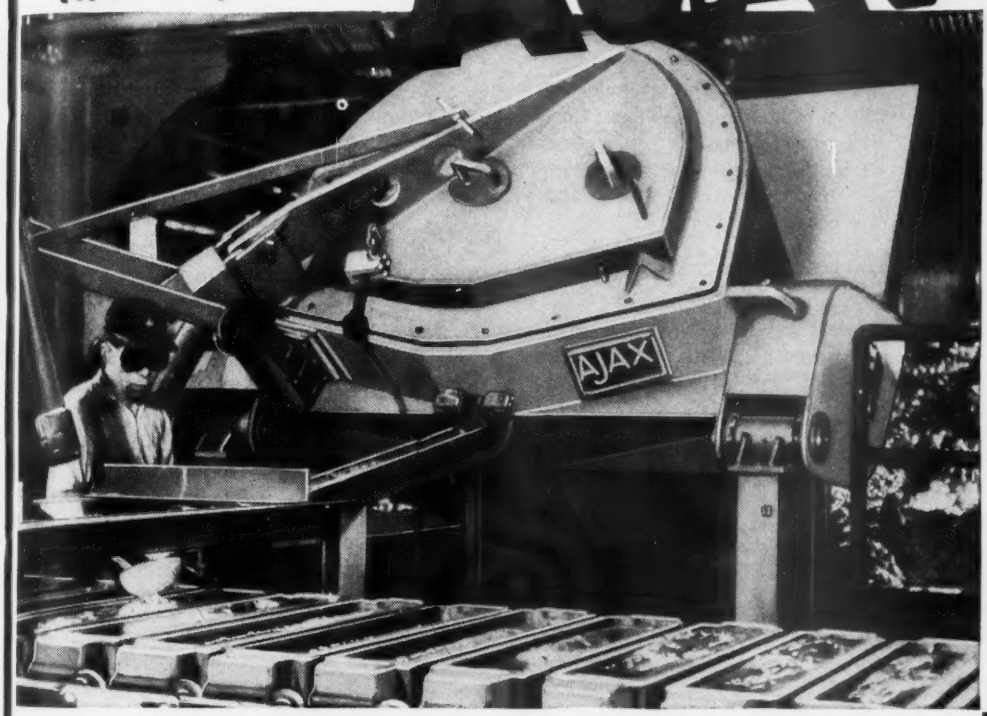
As the table rotates past the grinder, vertically moving pins in the bottom of each core-carrying cavity ride over a stationary cam. The pins are moved upward, raising each core in turn above the face of the revolving table. Meanwhile another cam mounted on the face of the revolving table cocks a spring-loaded ejector arm which is released just as a core is raised above the table surface and knocks it off into a box. The pin in the bottom of each succeeding core cavity then returns to original position.

As the table continues to rotate, it passes under a small ring made of ¼-in. tubing with holes drilled in the bottom. Compressed air fed to the tube blows sand grains out of the cavities, making them ready to receive another core.

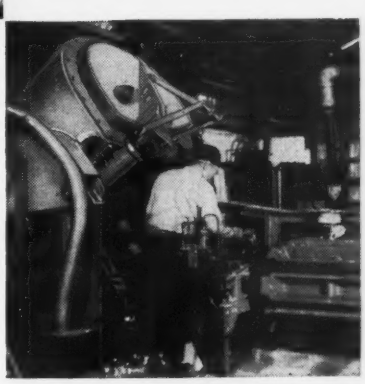
Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $10 for each idea submitted and published. Send a photo or drawing with your idea

Increase Your Profits—

get the highest possible recovery of aluminum scrap with the help of AJAX TAMA-WYATT Induction Furnaces—



AJAX induction furnaces are used in many plants for the efficient recovery of loose scrap, such as foil, chips, borings, turnings and the like. They are also adaptable for the full range of non-ferrous metals and alloys with the same advantages obtained in aluminum, and are built in sizes ranging from 20 kW to 1400 kW.



AJAX line frequency induction furnaces will melt aluminum foil scrap with the lowest obtainable melting losses. Photo above shows an AJAX 166 kW melting furnace installed at the plant of the Toyo Aluminum Works in Yao, near Osaka, Japan. Unbaled foil scrap shown at right edge of photo is remelted at the rate of about 900 pounds per hour with a recovery of over 99%. Molten metal is poured into ingot molds as shown in the front of the photo. Another view of same furnace is shown in small photo at right.

Send for Reprint of Article on Scrap Recovery by Induction Furnaces

AJAX TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, N. J.

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

Industry Briefs

SALES of industrial furnaces in the first half of 1953 were equal to 93 per cent of the volume for the corresponding 1952 period, according to the Industrial Furnace Manufacturers Association. A long-term trend toward more heat treating of metals was evident in healthy expansion of orders for metallurgical furnaces during June.

* * *

Carbon Malleable Casting Co., Lancaster, Pa., has changed its name to Pennsylvania Malleable Iron Corp. No other changes are involved. Officers of the company include Charles P. Speitel, president; Leo G. Emig, vice president and treasurer; Ernest F. Stople, vice president; Thomas M. Blank, vice president and production manager; Paul M. Hufford, secretary; and Charles P. Speitel Jr., assistant secretary. The firm has spent $250,000 on an expansion program since 1948.

* * *

Goehringer Foundry Supply Co., 919-921 West Fifth St., Cincinnati 3, has purchased the entire business of Foundry Devices Inc., Newton, O., manufacturer of lift pins, guides and matchplate lugs. All equipment and patterns have been moved to the Goehringer plant.

* * *

Sternaman Foundry Inc. has been organized at 924 Henrietta St., Springfield, Ill., with a capital of $5500. C. J. Sternaman, same address, is the listed agent. Carl M. Sternaman, 1052 Calhoun Ave., is president, and Kenneth Schumacher, 151 North McArthur Blvd., is secretary.

* * *

Rampe Mfg. Co., 3320 St. Clair Ave., Cleveland, has opened an additional plant at 8404 St. Clair Ave. Manufacture of the firm's tumbling equipment will be concentrated at the new location.

* * *

Ford Motor Co. is entering the farm machinery business on a wider scale and will supplement its farm tractors with a full line of agricultural equipment.

* * *

Kaiser Aluminum & Chemical Corp. has established its northwest operations office at 505 Spokane and Eastern building, Spokane, Wash. Norman L. Krey is manager.

National Gypsum Co., Buffalo, N. Y., has opened a New Orleans district sales office at 5300 Tchoupitoulas St., under the managership of Frank B. Phillips Jr. The new office will cover Louisiana and southern Mississippi, areas formerly divided between the company's Texas and Alabama sales offices.

* * *

Murray Corp. of America, Detroit, has purchased Eljer Co., Ford City, Pa., for approximately $16 million. Eljer makes a line of cast iron plumbing fixtures, brass fixtures and vitreous chinaware.

Misco Will Keep It Clean

Misco Precision Casting Co. operates a bright new investment casting foundry at Whitehall, Mich. (FOUNDRY, January 1953, p. 87), and it's going to have the wherewithal to keep it clean. The company recently received federal court approval to reorganize the Iowa Soap Co., Burlington, Iowa, with which it will merge. A desire to diversify its products was given as the principal reason for Misco's move. However, one newspaper wit thought he saw some connection between cast steel parts and Castile soap.

Rust Furnace Co., Pittsburgh, is constructing a new continuous pipe annealing furnace for the McWane Cast Iron Pipe Co., Birmingham. Designed to anneal centrifugally cast iron pipe, the new furnace will handle 2 and 3-in. diam pipe in lengths up to 20 ft. Capacity is about 15 tons per hour.

* * *

Duriron Co., Dayton 1, O., has opened a direct sales office in Needham, Mass., to serve the New England area. The office will be headed by R. W. Henze, who has served the organization since 1950 in the New York and Philadelphia areas.

* * *

Ipsen Industries Inc., Rockford, Ill., manufacturer of automatic heat treating equipment, is opening a branch office and warehouse for sales and service at 3400 Tudor St., Philadelphia. Personnel will include Alfred E. Stone, sales engineer; John Keegan, service engineer, and Mrs. Margaret Schramm, manager.

Lynchburg Foundry Co., Lynchburg, Va., has been awarded a certificate of Management Excellence by the American Institute of Management, New York. The AIM is a nonprofit foundation devoted to the study and improvement of management policies and practices. Lynchburg Foundry was cited for its "important and continuous research and development program" backed by "unusually vigorous staff divisions and functions for a company of this size."

* * *

Chain Belt Co., Milwaukee, has bought the Shafer Bearing Corp., Downers Grove, Ill. It will be operated as the parent company's Shafer Bearing Division, with R. P. Tennes, former president, as division manager. Shafer's bearings are particularly adaptable to power transmission and conveyor application.

* * *

Thor Power Tool Co., Aurora, Ill., will open a sales and service factory branch in Atlanta on Oct. 1. Scheduled to occupy quarters in a building under construction at 1363 Spring St., the Atlanta office will serve distributors and tool users in Georgia, South Carolina and Florida.

* * *

Certified Alloys Co., Bedford, O., producers of zinc alloys, has completed a one-story addition to the main plant which increases its production capacity 40 per cent. New facilities include a 40,000-lb reverberatory furnace and automatic pigging equipment.

* * *

Electro Metallurgical Co., a division of Union Carbide & Carbon Corp., New York, has placed new facilities in operation at its plant in Alloy, W. Va., which double the firm's capacity for producing medium-carbon ferromanganese.

* * *

Reading Chemicals, Wyomissing, Pa., which started manufacture of ferrotungsten a short time ago, is adding ferrotantalum-columbium and ferrotitanium to its products. The new company plans to incorporate shortly.

* * *

Swartwout Co., 18511 Euclid Ave., Cleveland, has appointed F. S. Crook Co., 455 Paul Brown Bldg., St. Louis to represent Swartwout's roof ventilator division in that area.

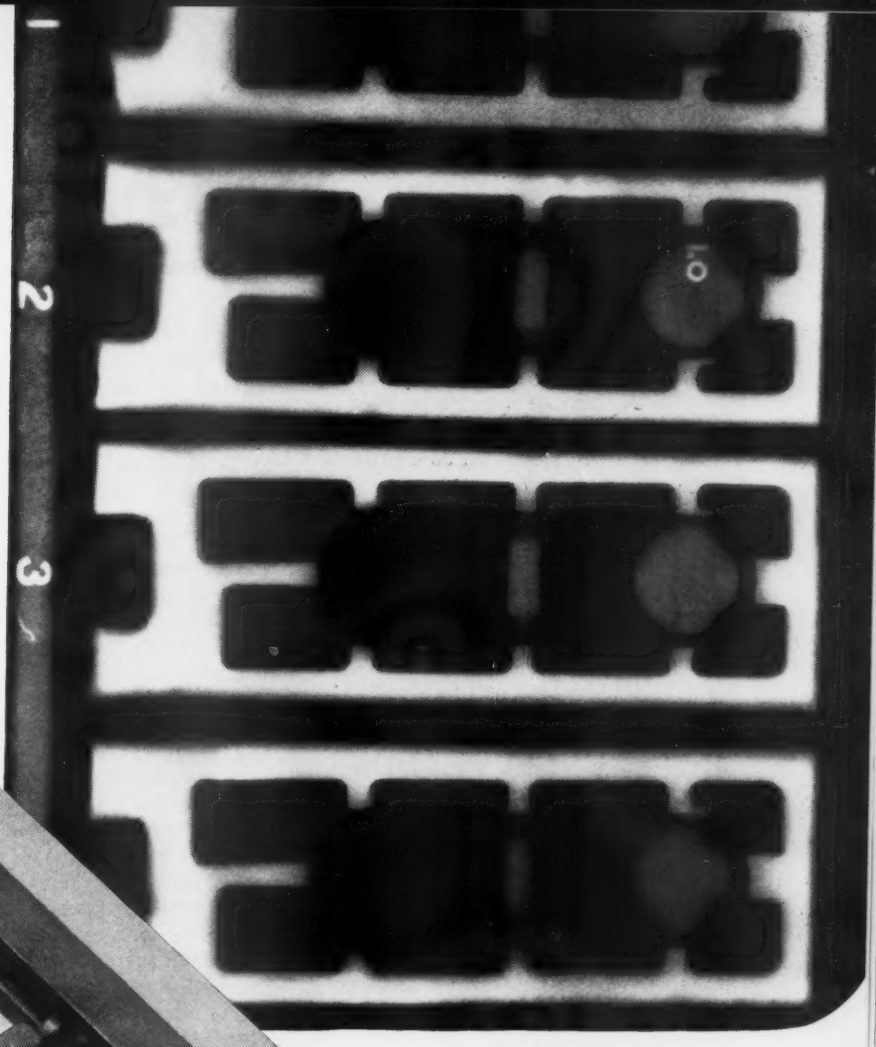
* * *

Jervis B. Webb Co., of California, conveyor manufacturer, has moved its general offices and factory to larger quarters at 9301 Rayo Ave., South Gate, Calif.

* * *

Pennsylvania Coal & Coke Corp., New York, has acquired control of Industrial Brownhoist Corp., Bay City, Mich.

RADIOGRAPHY prevents waste



Radiograph of an iron casting for a reciprocating ram.

when a $2 casting gets a $375 treatment

This is a casting for a reciprocating ram. It is to be machined and hand scraped to a final flatness of less than .0001 inch. Should porosity show up during machining, the cost of work done and heat treatment is wasted. The part must be scrapped, not scraped.

But radiography avoids that. By x-raying every casting, flaws are discovered before work is started . . . before hundreds of dollars have been invested in machining and heat-treating costs.

This is another example of the savings possible through radiography.

If you'd like to be sure all your castings are sound—if you'd like to know ways to improve yield in production runs—get in touch with your x-ray dealer. He'll gladly talk it over. Or, if you like, write us for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography . . .

another important function of photography

Kodak
TRADE-MARK

Around the Country

NEWS REPORTS FROM

Detroit
Chicago
Los Angeles
Philadelphia
New York
Washington

HIGH auto production continues to sustain foundry operations in the Detroit area. A few foundries are reported affected by cutbacks in defense spending, particularly in heavy steel lines, but no serious drop in business is apparent.

Backlogs generally are reported declining, and some observers feel this could portend a down-turn in business later in the year; however, most feel that a normal supply and demand relationship is being established and that firming business can be expected through 1953. Captive foundries of the auto companies in most cases are running six days a week to keep up with motor car assemblies.

FORD MOTOR CO. recently conducted its fourth annual Industrial Arts Awards competition, and 700 of the award-winning entries are currently on display at the Chicago Museum of Science and Industry. The display, conducted during the National Industrial Arts Awards Fair, opened Aug. 8 and will continue through Sept. 30.

The exhibits represent the best of more than 5000 entries from high schools and trade schools throughout the United States and its possessions. Prizes totaling $45,000 were awarded 1592 students in vocational education and industrial arts classes this year from 13 divisions, including mechanical drawing, wrought metal, patternmaking and molding, machine shop, and electrical. All entries were made in regular class projects under instructor supervision.

Patternmaking and molding each are divided into two groups with four prizes given in each group. From the four first prizes thus arrived at one Outstanding Achievement Award is made to represent the Patternmaking and Molding division.

Chicago area foundrymen can take pride in the fact that the Outstanding Achievement Award, as well as the $100 first award, in this division went to a Chicago area student—Robert Pawlak, 16, of 5625 W. 22nd Pl., Cicero, Ill., for a wood pattern entered in the patternmaking division. Pawlak, a junior at J. Sterling Morton High School, was instructed by P. R. Rohe.

There is satisfaction to Chicago district foundrymen also in the fact that of the 16 awards made in the Patternmaking and Molding division, five, excluding the Outstanding Achievement Award, were garnered by Chicago area students. Runner-up was Springfield, Mass., with three—two firsts and a second. Chicago had two firsts, one second, one third and one fourth. Cleveland and Philadelphia came next, each with one third and one fourth. Following with one each were Los Angeles, Milwaukee, Pontiac, Mich., and St. Paul.

But aside from the satisfaction which foundrymen can take in the foregoing performance in their own industry, there is a broader significance in the industrial arts competition for all citizens of this nation. Even the most casual inspection of the 700 award-winning entries in the exhibit will impress one with the superb workmanship which the contestants have wrought in their entries. And there must be thousands upon thousands of hours of patience and perseverance wrapped up in those entries.

FOUNDRYMEN are optimistic regarding the effect of the Korean truce on foundry activity. Their opinions are confirmed by an eight-month survey of Los Angeles industry by the Southern California Research Council, sponsored by Occidental and Pomona Colleges and financed by the Committee for Economic Development. Entitled "The Effect of a Reduction in Defense Expenditures Upon the Los Angeles Area", the report states that the Los Angeles boom is not likely to be affected seriously by the end of the shooting in Korea. However, the report cautions, with production of aircraft in the Los Angeles area accounting for nearly 25 per cent of the national total in valuation, reduction in local military aircraft production coupled with a decline in nonmilitary manufacturing activity is enough of a possibility to ". . .warrant protective planning" by local industry.

So far there have been no cutbacks in Southern California's giant, sprawling aircraft industry. Current contracts schedule production for several years and most of the industry leaders have said no cuts are contemplated.

Activity and backlogs of magnesium foundries supplying the aircraft manufacturers almost exclusively increased 10-15 per cent in the second quarter. These foundries are now operating at 70-80 per cent capacity, 15 per cent higher than in January. Most nonferrous foundries, both aluminum and brass, report like increases in activity.

In contrast to nonferrous activity, steel foundries report a letdown in business in the second quarter. Activity of the nonferrous foundries exceeds that of steel foundries for the first time this year. With output of steel foundries taken mostly by oil fields and refineries, lessened activity from these interests is enough to reduce backlogs from 4-6 months to 2 months.

The upturn is thought to result from renewed interest by casting users in rebuilding depleted inventories.

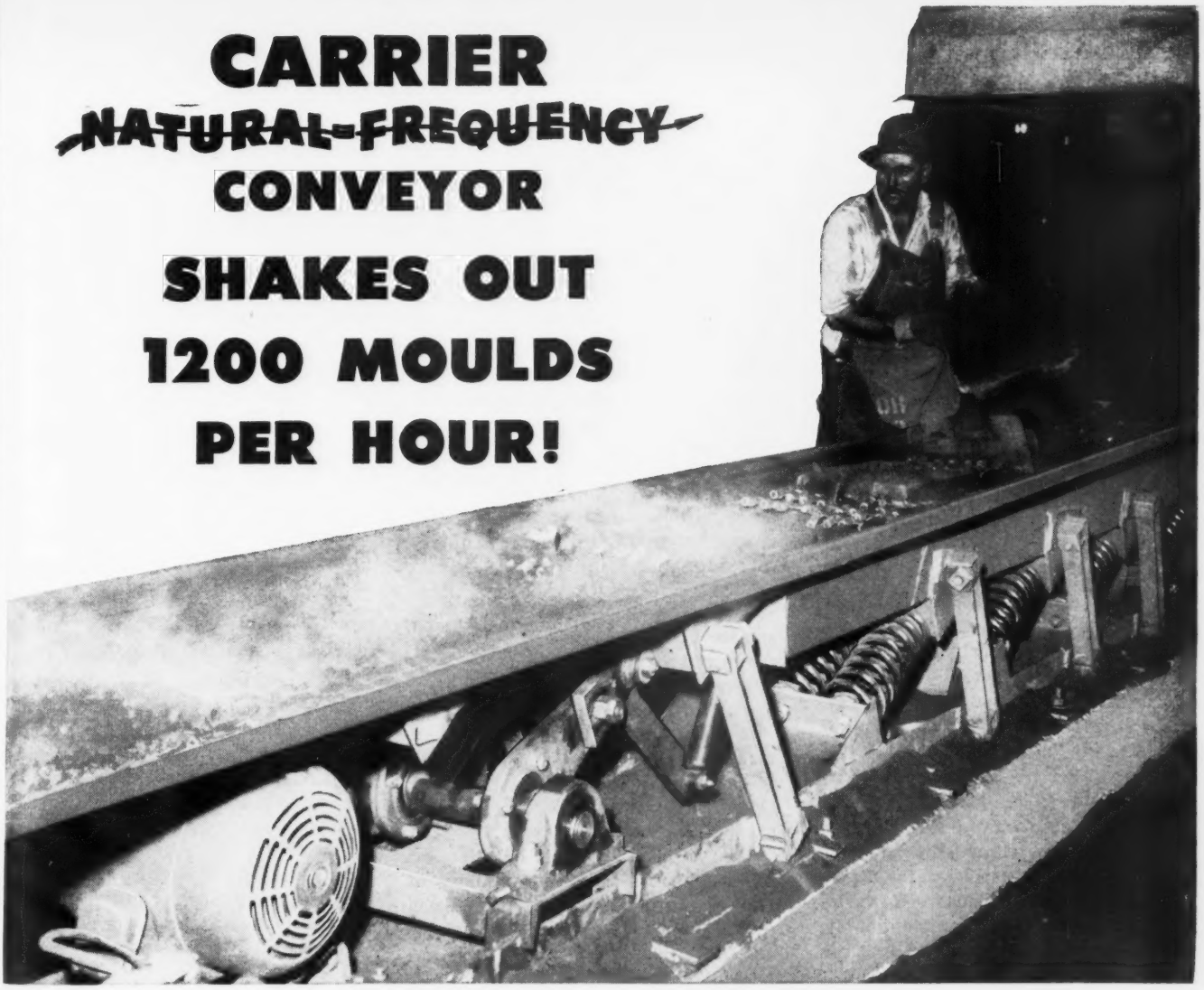
FOUNDRY operations in August will probably show some pickup, but foundrymen do not anticipate any material gain until after Labor Day. By that time vacations and warm weather will be largely over.

Gray iron shops, which have their vacations behind them, are operating five days a week. This includes pressure and soil pipe shops, as well as jobbing foundries, with the latter engaged mostly in small work. Backlogs average about a month.

(*Concluded on page* 174)

CARRIER
~~NATURAL-FREQUENCY~~
CONVEYOR

SHAKES OUT 1200 MOULDS PER HOUR!



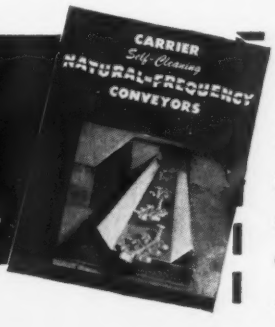
The 35-foot, 5 H.P. Natural-Frequency Conveyor shown above is a real glutton for punishment. It shakes out and conveys 1200 8x14x16 moulds of brass castings per hour — a rugged, heavy-duty job involving from 60 to 100 tons of sand per hour, plus castings!

Carrier Natural-Frequency Conveyors are now delivering spectacular conveying and shakeout performances for scores of foundry operations throughout the country—from the smallest precision castings on up to extremely large, heavy castings. Mail the coupon for all the facts, *today!*

Here's what the Vice-President of the Foundry using the Carrier Natural-Frequency Conveyor illustrated above says about it:

"The performance of this conveyor is very adaptable to our type of work. The long length of the conveyor gives ample time for the separation of the sand from the castings and the removal of the bottom board. It also helps keep different types of castings separated."

Get the Facts About These Rugged Conveyors



Carrier Conveyor Corporation — Dept. 18
Frankfort Avenue at Clifton, Louisville 6, Ky.

Gentlemen: Without obligation, please send me your bulletin describing Natural-Frequency Conveyors.

Firm_____

Street_____

City_____ State_____

Att: Mr._____ Dept._____

(*Concluded from page* 172)

Malleable shops appear to be doing a little better than at the beginning of the summer. Backlogs range one to two months, with most activity in agricultural requirements and standard plumbing items. Railroad needs are light and, while there is some automotive work, it is small compared with that engaging foundries in the midwest.

Steel casting demand continues to slacken off, reflecting particularly a drop in defense work and requirements for heavy trucks. Whereas earlier in the year backlogs ran seven to eight months, they are now down to around two to three months. Operating rates are currently about five days a week, whereas a while back they ran at least five and a half days. Steel foundries generally are out hunting work.

Bronze and brass shops are relatively busy, considering the season of the year. Practically all work is of a civilian character. Aluminum and magnesium shops continue busy, reflecting particularly the needs of the aircraft industry.

The smaller of the two blast furnaces of the Alan Wood Steel Co., Swedeland, Pa., went down early in the month for relining. Operations will probably be suspended for a period of six to eight weeks. However, iron seems to be in ample supply, with a fair volume coming in from abroad. Scrap is plentiful.

CONSIDERING vacations and hot weather, district gray iron shops have been doing fairly well. Most have been able to operate around five days a week and sustain backlogs of four to five weeks. Operators look for some gain after Labor Day.

All are driving for business, and this includes even the steel foundries, which are feeling the effects of less defense work and have far lighter backlogs than they have had at any time within the past few years. Steel casting shops, however, still have enough work ahead to keep them operating at a comfortable rate for the next several weeks. Malleable operations are steady at around five days a week, with backlogs averaging five to six weeks,

While the brass and bronze jobbing shops report spotty demand, most captive shops are quite busy, especially those engaged in pumps and meters. The most decisive decline has been in ship work, among the more important consuming lines here. Aluminum shops are active, due to well sustained demand from the aircraft industry.

DESPITE months of intensive research by the Air Force and the aviation industry, no conclusive answer has been found to the question: Will turbojet engine blades in future be cast or forged?

No early answer is in sight for the reason that alloys have not yet been developed to meet the strength, impact resistance and corrosion resistance properties that will be demanded at the higher metal temperatures for which designers are preparing. Until such alloys become available, there can be no complete answer to the question as to whether the forming technique will be casting or forging—or perhaps compacting of metal powder.

That's the way William H. Woodward, chief, Propulsion Division, Washington office, National Advisory Committee for Aeronautics, sums up the present outlook.

The problem is important because under wartime conditions millions of blades would have to be produced monthly to supply the needs for the axial-flow turbojets. It further is important because the number of hours a jet plane can function without overhaul depends on blade quality.

Of prime interest are the blades in the hot end of the engine. Here there is no present difficulty, since the blades now in production will satisfactorily stand up under metal temperatures to around 1500° F. The two categories of blades—the rotating turbine buckets and the stator vanes which direct the hot-gas flow —are being made of chromium-nickel-cobalt alloys. The stator vanes are produced almost exclusively as castings. The turbine buckets usually are forgings, although some designers specify castings in this use.

But the trend in jet engines is rapidly toward higher metal temperatures and the designers are asking: What shall we use to go to 2000° F?

The answer, according to Mr. Woodward, is not likely to be found in cobalt or nickel alloys. These alloys already have been developed so as to obtain virtually all the high-temperature characteristics that can be expected of them, and cobalt could not be relied upon since under full mobilization it would at once become too scarce. So, as researchers look at the picture, chromium and molybdenum appear the most promising of the metals in preparing for the higher metal temperatures.

Obstacles Must Be Overcome

But obstacles exist in both cases. Alloys containing 50 per cent or more molybdenum are ductile and well suited for forging (no attempt has been made to use them in making cast blades) but they have extremely poor resistance to oxidation at high temperatures. On the other hand, chromium alloys are strong and oxidation resistant but they are brittle in the forged form and even more so as castings. Little progress has been made in developing an answer to the question: Can we alloy chromium sufficiently to get ductility and reduce brittleness without losing strength at high temperatures?

If we develop a suitably oxidation-resistant molybdenum alloy, or a combination of such alloy plus a protective coating, it appears probable that turbine buckets for the hot end will be forged. If we develop a suitably ductile chromium-base alloy the reverse may be expected. However, due allowance must be made in such a forecast for the disposition of many designers to favor forgings as permitting better control of physicals.

In the cool, or compressor, section of the engine current practice is to make the rotating blades, usually termed compressor blades, of stainless steel by forging. For future engines the designers are considering other materials — particularly aluminum and iron alloys in powder form compacted to shape—for the compressor blades. Stator vanes in the compressor end are aluminum alloy, either cast or forged, depending on designers' preferences. The only problem with the stator blades is picking the best of a number of existing alloys rather than having to develop a new alloy.

"He said he had some trouble on hole four, and he's trying to get back to the course!"

NEWARK...

FOUNDRY MARKET AREA NUMBER NINE

ANNEALSHOT
chilled shot and grit
SUPER-ANNEALSHOT
malleable shot and grit

With an annual production of over a half million tons of castings, Newark ranks as the leading foundry market area on the east coast. 35 of the area's 168 foundries employ 100 or more people, with total employment exceeding 16,000. There is an unusually large number of jobbing foundries in the area, turning out a wide variety of products, predominantly in gray iron, brass and aluminum. You'll find ANNEALSHOT and/or SUPER-ANNEALSHOT in many of the area's gray iron foundries because here, too, foundrymen have learned that these excellent abrasives really hold cleaning costs to a minimum. For particulars, phone your Metal Blast representative or write direct to **METAL BLAST, Inc.**, 872 East 67th St., Cleveland 3, Ohio.

Statistics from Penton's
HOW TO SELL THE FOUNDRY MARKET

"Certified" Abrasives

CLEAN MORE CASTINGS PER DAY!

SPEED UP production in in *your* blast cleaning room with "Certified" Abrasives. "Certified" Samson Shot and Angular Grit are first choice in hundreds of foundries...give better, longer performance because they're made *extra-tough* by a special *automatically controlled* hardening process. Specify "Certified" and start cleaning more castings per day.

All sizes graded to S.A.E. specifications

Experienced Foundrymen say:

Always specify "Certified"

ACCEPTED AND USED FOR OVER 55 YEARS

PITTSBURGH CRUSHED STEEL CO., Pittsburgh, Pa.

STEEL SHOT AND GRIT CO., Boston, Mass.

MEMBER FEMA

NFA Plans 55th Annual Meeting, Sept. 17-18

The National Foundry Association will hold its 55th annual meeting at the Plaza Hotel, New York, on Sept. 17-18. Program of the two-day convention has been designed and the speakers selected to further the objectives of the NFA.

Formed originally in 1898, the National Foundry Association has served foundry management through the years as industry spokesman in national affairs, as a clearing house of information on wage and labor agreement data, and as a counselor in the field of industrial relations and all management fields other than technical.

The business meeting, on Sept. 17, will be opened by President Summerfield Brunk's report on the association's activities and accomplishments during the past year. President Brunk will be followed by Martin Gainsbrugh, chief economist and director of business economics, National Industrial Conference Board, who will discuss present economic pressures affecting industry — and their effect on future business activity.

Frank Juraschek, assistant director, distribution and availability, U. S. Steel Corp., and also chairman, Industrial Marketing Committee, American Marketing Association, will discuss "Practical Results of Industrial Marketing Research".

Other speakers for the day will be a well known U. S. senator, an authority on industrial hygiene and air pollution, and a leader in the field of supervisory training who have given tentative acceptances.

The day's business session will come to a close with the report of the Resolutions Committee and installation of officers. In the evening a reception and cocktail party to which all in attendance are invited will be given in honor of the new officers.

Friday will be set aside for a labor-management panel discussion and open forum. The panel will consist of an experienced arbitrator, qualified management spokesmen and high-ranking union leaders. J. Noble Braden, executive vice president of the American Arbitration Association, will conduct the forum as moderator. Management representatives will be Paul Arnold, resident manager, United States Pipe & Foundry Co., and Harry Kelly, director of industrial relations, American Seating Co. Labor spokesmen are Harry

(*Concluded on page* 179)

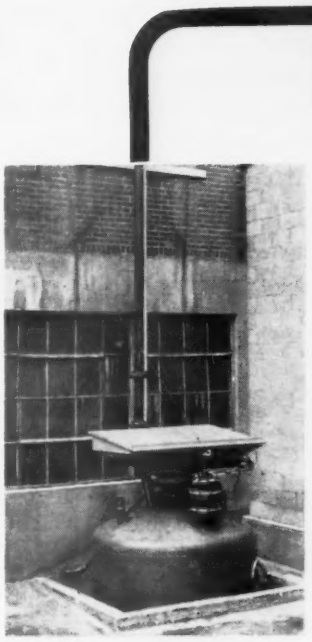
"nothing moves but the sand"

Brady Cloth Bag Filter installed on the Powell Plant roof. Mounted on a "Brady Metal" cyclone section. Sand conveyed is quite dry, so this unit is used to control fine sand particles.

A BRADY FLO-VEYOR SYSTEM is solid, permanent and well established. Like the monuments of Egypt, it remains constant while the sand alone moves. Conveyor lines are made of steel piping, but all bends and turns are cast of our hard wear resistant iron "Brady Metal" for long life and low maintenance cost. A Brady pneumatic conveyor system saves labor, is self-cleaning, dustless, goes through or around obstructions, and moves heavy tonnage hourly at small cost per ton.

The Brady "FLO-VEYOR" Sand Handling System installed recently at the William Powell Company Plant in Cincinnati includes a Brady Cloth Bag Filter with automatic shaking mechanism to clean the bags. Plant compressed air moves the unprepared core-sand through the pipes in a matter of seconds, and delivers it where required. There are no moving parts to the "FLO-VEYOR"; truly, nothing moves but the sand.

WRITE FOR BULLETIN "F"



"FLO-VEYOR" pressure vessel at the Powell Plant. A pressure reducing valve is used to effect sand conveyance at lowest air pressure practicable.

THE BRADY CONVEYORS CORPORATION

20 WEST JACKSON BOULEVARD, CHICAGO 4, ILLINOIS, U. S. A.

Offices In All Principal Cities

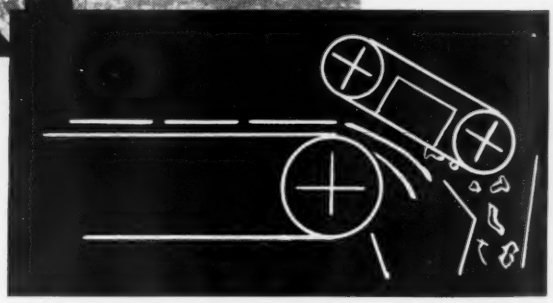
Here's one of the most important advances in magnetic tramp iron separation in years . . .

the NEW Dings "In-Line" *Self-Cleaning* SUSPENDED MAGNET

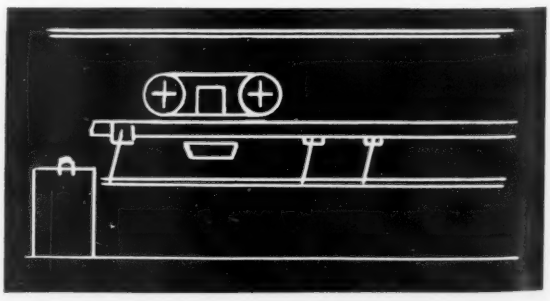
DINGS "In-Line" Magnets pull tramp iron of any shape out of conveyor belt burdens traveling at any speed. They do the job where even the largest diameter magnetic pulley would fail — where burden trajectories are almost horizontal.

Iron extraction with the Dings "In-Line" is parallel to burden travel and at the same speed. That's why this magnet can handle long iron rods with ease.

Dings "In-Line" is especially well suited for integration with pan-type conveyors being used by more and more foundries (see diagram). See your Dings representative for more information.



Dings "In-Line" extracts and discharges tramp iron in the direction of the burden flow—at the same speed as the burden moves. That's why it can pull out iron rods without tearing or gouging belts. "Selective" lifting of the iron to the magnet eliminates objectionable carryover of sand with the iron as usually experienced with magnetic head pulleys.



When used with a pan-type conveyor such as the Simplicity, Dings "In-Line" carries iron over the gap, through which the magnetically separated sand falls into a secondary conveyor, onto discharge end of conveyor.

Dings

DINGS MAGNETIC SEPARATOR CO.
4708 W. ELECTRIC AVE., MILWAUKEE 46, WIS.

(*Concluded from page* 176)

Southwell, president, Local 174, CIO-UAW, and David Feller, assistant general counsel, CIO-Steelworkers.

The panel will discuss President Eisenhower's suggested changes in the Taft-Hartley law and critical issues now coming to the bargaining table. This panel will afford foundry management an unusual opportunity to hear outstanding men on both sides present arguments in support of their position. Basically, these arguments will be the same ones used when the Taft-Hartley Act comes up for consideration again at the next session of Congress.

James F. Lincoln, president, Lincoln Electric Co., Cleveland, will feature the luncheon session on Friday. Mr. Lincoln will discuss the need for and application of "Incentive Management" in industry.

On Sept. 16, the day prior to the open meeting, officers and members of the administrative council will meet to elect the officers of the association for the coming year. Present officers of the NFA are: President, Summerfield Brunk, president, Headford Bros. & Hitchins Foundry Co.; vice president, W. W. C. Ball, vice president, Taylor & Fenn; treasurer, Frank J. Sherwin, president, Chicago Hardware Co.; executive secretary, Charles T. Sheehan.

The annual Alumni Banquet will be held on the evening of Sept. 16. At this dinner, which will be attended by past officers of the Association, recognition will be accorded to the organization's living past presidents: Thomas W. Pangborn—1933-36, Franklin R. Hoadley—1936-39, William D. Hamerstadt — 1939-42, Herman Menck—1944-46, I. R. Wagner—1946-48, Franklin Farrel, III—1948-49, Harry E. Ladwig—1949-50, A. V. Martens—1950-52.

Publishes 1953 Lighting Specifications Book

The completely revised 1953 edition of *RLM Standard Specifications for Industrial Lighting Units* has been published by the RLM Standards Institute. New specifications cover 15 variations of three new "upward component" RLM semi-direct fluorescent units which direct from 20 to 30 per cent of the light upward, and several important revisions in specifications have been made.

Complimentary copies of the volume now are available from lighting equipment manufacturers who are members of the institute or from the institute itself, 326 West Madison St., Chicago 6.

For superior castings at lower cost!

Photos courtesy of Blackhawk Foundry Company, Davenport, Iowa.

SCHENECTADY

SHELL MOLD RESINS

More and more Foundries are finding versatile Schenectady phenolic resins give better, all-round shell molding results. SP-7452, for example, offers the maximum in hot rigidity and fast cure while maintaining the proper flow. Moreover, tests indicate that shells made with this resin are stronger—an economy factor permitting reduction in the amount of resin required. In addition, SP-7452 offers superior hot strength and less odor. It pays to check with Schenectady for the right shell molding resins and for service help that is geared to meet your *own* requirements.

MAIL THE COUPON TODAY
for the Schenectady Shell Molding Catalog or for specific application information.

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Div. of Schenectady Varnish Company, Inc., 200 Congress Street, Schenectady 1, N. Y.

☐ Please send me your new Shell Molding Catalog.
☐ Please have one of your representatives call.

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BUYERS AND SELLERS RATE EACH

Foundry purchasing agents and salesmen for foundry equipment and supplies companies were given an opportunity to evaluate each other in a recent study. The results are detailed here

THE average foundry purchasing agent is influenced more by the supplier's reputation than by any other factor in buying foundry equipment and supplies. He is influenced least by the salesman's efforts.

On the other hand, the average salesman says that only 57 per cent of the purchasing agents he calls on understand the needs of their business and only 40 per cent of them have authority to make buying decisions.

These opinions were developed in a recent poll of representative foundry purchasing agents and salesmen of foundry equipment and supply firms in which they were asked to reply to the questions shown in the accompanying tables. Purpose of the study is to suggest to each group ways in which they can improve their business relationships.

Delivery Is Important—From the response by purchasing agents it appears that, next to reputation of the supplier, promptness of delivery is most important in influencing buying. Then follow extra services offered by the supplier, lower price and efficiency of the salesmen, in that order.

It is interesting to note in the accompanying table that reputation and service are impressively more important to the buyer than price or direct sales effort. However, the answers also indicate that after a buyer has satisfied himself on the reputation and service offered by various companies, his selection of a supplier is influenced strongly by efficiency of salesmen, following price closely in importance. In making their decisions on this question, purchasing agents were asked to consider products of equal merit.

Salesmen Rate Fairly Well—Despite purchasing agents' avowed resistance to direct sales efforts, they rate salesmen rather well. Purchasing agents say that 72 per cent of salesmen who call on them have a comprehensive knowledge of the product they sell, 68 per cent are tactful in their dealings, 65 per cent keep promises which they make and 63 per cent give direct answers to questions.

However, only 51 per cent of them determine needs of the foundry before attempting to sell the purchasing agent concerned. It also was pointed out that 37 per cent of them oversell their product, 35 per cent waste time in idle conversation, 27 per cent are overly aggressive and 26 per cent indulge in gossip.

Only slight variations in opinion expressed were shown by foundries of different size. In general, purchasing agents in foundries employing 250 or more showed a tendency to feel that salesmen were less tactful and less apt to give direct answers to questions. In smaller size foundries ratings for tactfulness and direct answers were higher.

And So Do Buyers—Salesmen return the compliment in their ratings of purchasing agents for those characteristics ordinarily associated with successful buyers. Except for those classifications previously described, having to do with understanding their business and authority to make decisions, 72 per cent of the purchasing agents were commended by salesmen for giving prompt reception to visiting salesmen, 70 per cent listen to the sales story, 65 per cent are tactful and 62 per cent permit salesmen to call on shop personnel. Most salesmen also said that less than 23 per cent of the buyers waste time in idle conversation and only 15 per cent exert pressure on salesmen to

WHAT SALESMEN SAY

- What percentage of foundry purchasing agents on whom you call possess the following characteristics?

Give you prompt reception	72%
Listen to your story	70%
Understand needs of their business	57%
Have authority to make decisions	40%
Permit you to call on shop personnel	62%
Tactfulness	65%
Pressure you to buy lunches, drinks, ball game tickets, etc.	15%
Waste time in idle conversation	23%

- Do you call on purchasing agents when you have nothing to sell, such as in a period of shortages? ..... YES—89%

- What are purchasing agents' reactions to such calls?

Favorable	68%
Unfavorable	2%
They give no indication	30%

- Rate the importance from a business point of view of the following forms of customer entertainment:

(Shown in order of preference)

Lunch . . . Golf game . . . Dinner . . . Fishing trip . . . Ball game . . . Cocktail party

(19% said they did not entertain)

- If you call on accounts other than foundries, how do foundry purchasing agents compare with those of other businesses in terms of characteristics listed in first question above?

Better	13%
About the same	70%
Not as good	17%

By ROBERT H. HERRMANN
Associate Editor

ANOTHER

buy them lunches, drinks, ball game tickets, etc.

Getting back to the salesmen's opinions that purchasing agents do not understand the needs of their business, it should be pointed out that a majority of the buyers state that they do not spend all of their time in the purchasing function; others outside of the purchasing department do buying and salesmen are permitted to contact, on the job, these other persons.

As might be expected, this picture is not the same for foundries of all sizes. A majority of purchasing agents in foundries employing over 1000 spend all of their time in the purchasing function, no one outside the department does buying, and salesmen deal only with the purchasing agent. Foundries employing 250 to 999 have purchasing agents who devote their entire time to the job and are almost evenly divided as to whether outsiders buy and permit salesmen to contact those outside the department who do buying.

In the groupings of foundries employing 249 or less, those who do the buying spend only a part of their time in that capacity; a slight majority have persons outside the purchasing department do buying, and a large majority permit salesmen to present their story to men in the shop.

In the matter of supplying information helpful in solving foundry problems, practically 100 per cent of the foundrymen say that they do. Sales managers, however, are not quite so dogmatic; for every ten who say they supply such information, one says he doesn't. Purchasing agents agree with sales managers, saying ten to one that such information is furnished.

On the other hand, 97 per cent of the purchasing agents say they encourage salesmen to provide such information, whereas 77 per cent of the salesmen feel that they are so encouraged and only 69 per cent of sales managers admit to encouragement.

How To Entertain—Proper forms of customer entertainment in making worthwhile business contacts, the value of such entertaining or even the necessity for entertainment often come up for discussion. From the viewpoint of those who would be entertained—the purchasing agents—entertainment is unnecessary. Seventy per cent of them feel that way, and presumably being entertained would have no bearing on where they placed their orders. Salesmen and sales managers disagree, however. As a combined group 80 per cent of them feel that entertaining customers is a necessary part of their sales activity.

When entertaining is done, however, both sellers and buyers agree that lunch is best; cocktail parties are rated as least satisfactory. But the majority point of view among purchasing agents is that they submit to entertainment rather than welcome it. Size of company, however, does have some effect on the thinking of purchasing agents concerning entertainment. In the larger companies, those employing upwards of 250, approximately 50 per cent feel that entertainment is unnecessary. On the other hand approximately 75 per cent of buyers in companies employing less than 249 feel that entertainment is unnecessary.

Among sales managers of larger companies the feeling is that entertaining is a must. The smaller the companies become the more apt they are to feel that it is unnecessary. With salesmen, however, the opinion is different. Those with larger companies (employing 16 or more salesmen) and those with smaller companies (1 to 4 salesmen) attach less importance to entertainment than do the companies in between.

Purchasing agents also were asked if they considered a sales presentation as effective at the luncheon table or "over a drink" as it is in their office. They voted four to one that it is not. Majority of opinion

(*Concluded on page* 184)

WHAT FOUNDRY PURCHASING AGENTS SAY

- Do you spend substantially all of your time in the purchasing function? ..... NO—65%
- Do you permit salesmen to contact, on the job, other persons who influence buying? ..... YES—72%
- What percentage of foundry equipment and supply salesmen who call on you possess the following characteristics?

Knowledge of their product	72%
Tactfulness	68%
Give direct answers to your questions	63%
Determine your needs before attempting to sell	51%
Keep promises	65%
Oversell their product	37%
Are overly aggressive	27%
Waste time in idle conversation	35%
Gossip	26%

- What percentage of salesmen who call on you supply information helpful in solving problems in your foundry? ... 90%
- Is a sales presentation as effective at the luncheon table or "over a drink" as it is in your office? ..... NO—81%
- Do you want salesmen to call on you even though they have nothing to sell, such as in a period of shortages? .. YES—83%
- Rate the factors having the greatest influence on your decision to buy. (Consider products of comparable merit)

  (Shown in order of influence)

  Reputation of supplier . . . Promptness of delivery . . . Extra service offered by supplier . . . Lower price . . . Efficiency of salesman
- Do you object to having a salesman bring in his boss on an important sale to help "clinch the deal"? ..... NO—70%
- What type of social meeting do you prefer in making worthwhile business contacts with suppliers?

  (Shown in order of preference)

  Lunch . . . Dinner . . . Golf game or fishing trip . . . Cocktail party . . . Ball game

  (70% considered entertainment unnecessary)

One man produces 68 more molds with OSBORN ROTA-LIFT

ALUMINUM • ALUMINUM BRONZE • MANGANESE BRONZE • BRASS • BRONZE • COPPER

BADGER BRASS & ALUMINUM FOUNDRY CO.

Sand Castings (B|A|B) *Centrifugal Castings*

Machining

5120 W. STATE ST.
Milwaukee 8
BL. 8-8200

June 4, 1953

Mr. George E. Miller, Sales Manager Machine Division
The Osborn Manufacturing Company
5401 Hamilton Avenue
Cleveland 14, Ohio

Dear Mr. Miller:

You will be interested in a performance report on the Osborn Rota-Lift molding machine installed in our molding department several months ago. As you can see, results attained with our Rota-Lift more than substantiate earlier predictions on increased output per man and lower molding costs.

Formerly our molds were made on two separate machines using cope and drag patterns and requiring two operators. One man made copes and one man made drags with a daily production of 32 molds per man.

Using match plate patterns with our Osborn Rota-Lift, one man now produces 100 complete molds a day ... making both copes and drags and closing the mold. This is actually 68 more molds a day per man. Our superintendent further reports that these molds are accurate and uniform. Since the Rota-Lift eliminates the heavy manual lifting we had before, our molder is able to maintain even production throughout the day which, of course, helps to cut foundry molding costs.

Very truly yours,

Ray T. Pagel

President

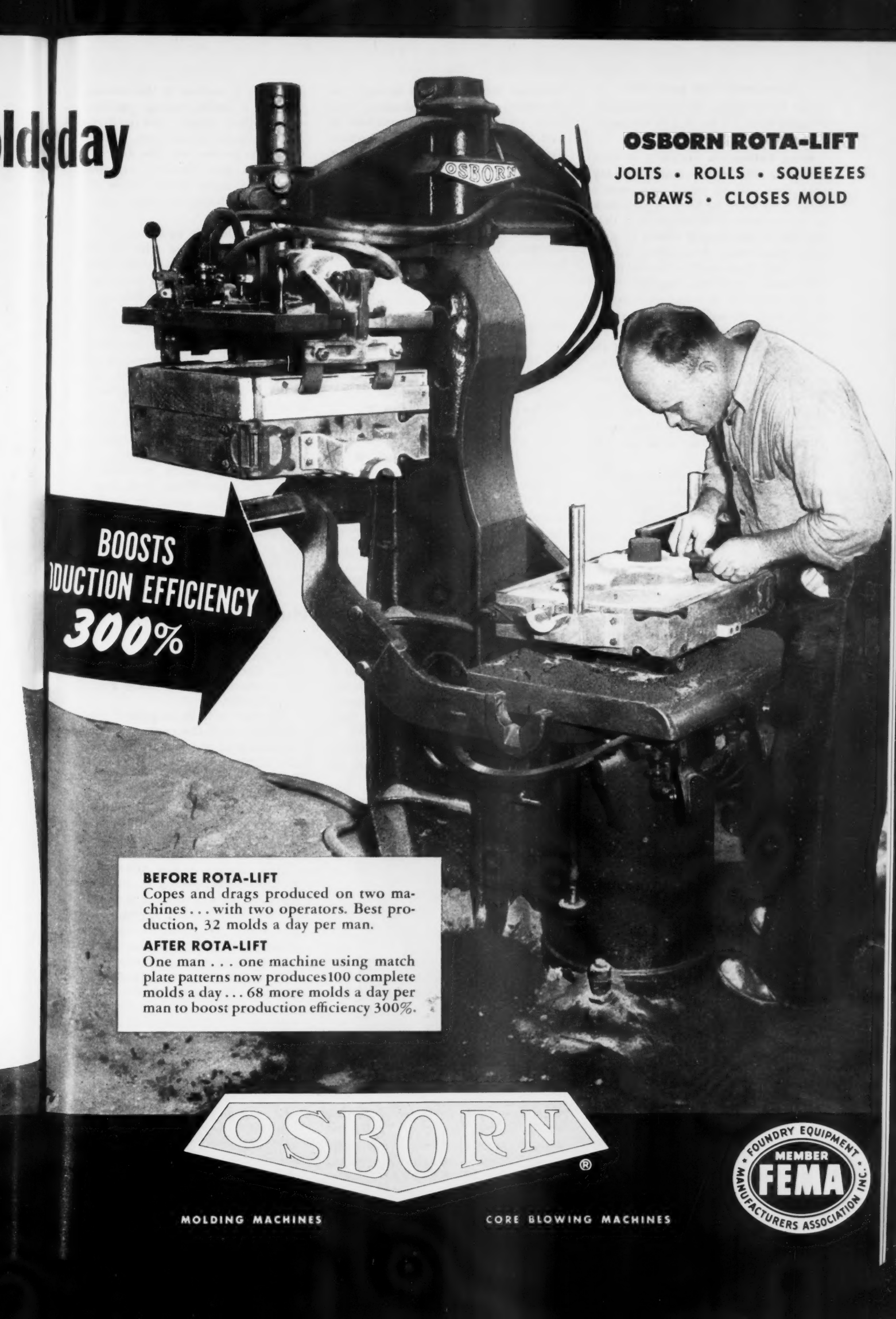
Ray T. Pagel

ANOTHER EXAMPLE OF OSBORN LEADERSHIP AND ADVANCED ENGINEERING

REPRESENTATIVES: Ray A. Scharer & Co., 3000 East Grand Boulevard, Detroit 2, Michigan
John C. Kemp, 1116 South Lincoln, Park Ridge, Illinois

THE OSBORN MANUFACTURING COMPANY
5401 Hamilton Avenue Cleveland 14, Ohio

ldsday



OSBORN ROTA-LIFT

JOLTS • ROLLS • SQUEEZES
DRAWS • CLOSES MOLD

BOOSTS
DUCTION EFFICIENCY
300%

BEFORE ROTA-LIFT
Copes and drags produced on two machines . . . with two operators. Best production, 32 molds a day per man.

AFTER ROTA-LIFT
One man . . . one machine using match plate patterns now produces 100 complete molds a day . . . 68 more molds a day per man to boost production efficiency 300%.

OSBORN®

MOLDING MACHINES

CORE BLOWING MACHINES

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

(*Concluded from page* 181)

is the same among all size foundries, ranging from 2:1 to 13:1 in the negative column.

Keep Calling—A majority of both salesmen and sales managers say that they call on purchasing agents when they have nothing to sell, such as in a period of shortages and that reaction of purchasing agents to such calls is favorable. Purchasing agents agree that they want sellers to make such calls. They also say that they do not object to a salesman bringing in his boss on an important sale to help "clinch the deal."

In concluding their summary of relationships with purchasing agents, representatives of foundry equipment and supply firms who call on accounts other than foundries say that purchasing agents in the foundry industry are no different than those in other businesses.

Many of the questionnaires returned contained voluntary comments on some phase of buyer-seller relationships. For the most part these remarks enlarged upon the commentator's opinion as expressed in the questionnaire proper. But they do show some of the current thinking in the industry.

Knowledge Is Scanty—A number of salesmen of large foundry equipment, which falls into the classification of capital machinery, said that many purchasing agents have insufficient technical background to evaluate properly the merits of various types of equipment. Many of them are too proud to admit this and often refuse to refer salesmen to the proper shop men who have a fuller understanding of the equipment and can ask pertinent questions about it.

Frequently, it is claimed, important printed information given to a purchasing agent is not passed along to the person who should have it. Verbal data are misinterpreted. In many instances men in the shop are said to put up with lack of co-operation by the purchasing agent because they don't want to get in bad with the "front office."

It also was pointed out that purchasing agents often assume more authority than they possess. That type of buyer is the hardest one to by-pass in attempting to get to someone with authority. Buying decisions frequently rest with senior executives of the company.

The suggestion was made that the best interests of any foundry will be served when purchasing agents arrive at the realization that a knowledge of detailed operations of equipment is not their job but that of the technical shop men, and arrange for discussion between salesmen and those technical men. Acquisition of raw materials, the qualities of which have a direct bearing on turning out the best possible castings, should be handled in the same manner.

The general thought seems to be that purchasing agents should act as liaison officers between suppliers, the technical men and those who make final buying decisions in their foundries. That some foundries conduct their buying in that manner is well known. There isn't a better way of showing that than by quoting the purchasing agent of one large (500 to 999 employment) foundry, who said:

"No others do buying, but we depend a lot, or entirely, on others for quality or suitability guidance. We only know which cupola block lasts the longest by talking to the foundry people. If a salesman has a radically new idea about cupola block, we then try to decide if his knowledge is sound or not. If sound, we take him to the foundry at once. If not, we ease him out as politely as possible."

Salesmen Need Experience — As shown by a number of the comments there is a feeling among purchasing agents that supply and equipment manufacturers should pay more attention to putting into the field salesmen who have foundry experience. Too many sales people know little about the industry to which they are trying to sell.

One purchasing agent stated that usually the salesman who has positive proof of the results of his product and is able to cite cases that can be checked easily has an advantage in making the sale. It comes back to the fact that a salesman should have had practical foundry experience.

Another cautioned against synthetic knowledge, saying that too many salesmen "know" too much about too many problems.

The manager of a small foundry (less than 20 employment) expressed the desire that salesmen leave literature describing their product. No doubt the foundryman feels that his time should be spent in producing castings rather than in listening to salesmen. At his leisure he can read the literature and be ready to question the salesman on his next visit.

Alloy Casting Institute Holds Annual Meeting

Technical discussions at the thirteenth annual meeting of the Alloy Casting Institute, held June 28-30 at Hot Springs, Va., covered a variety of research subjects, with especial emphasis on titanium casting techniques and shell molding.

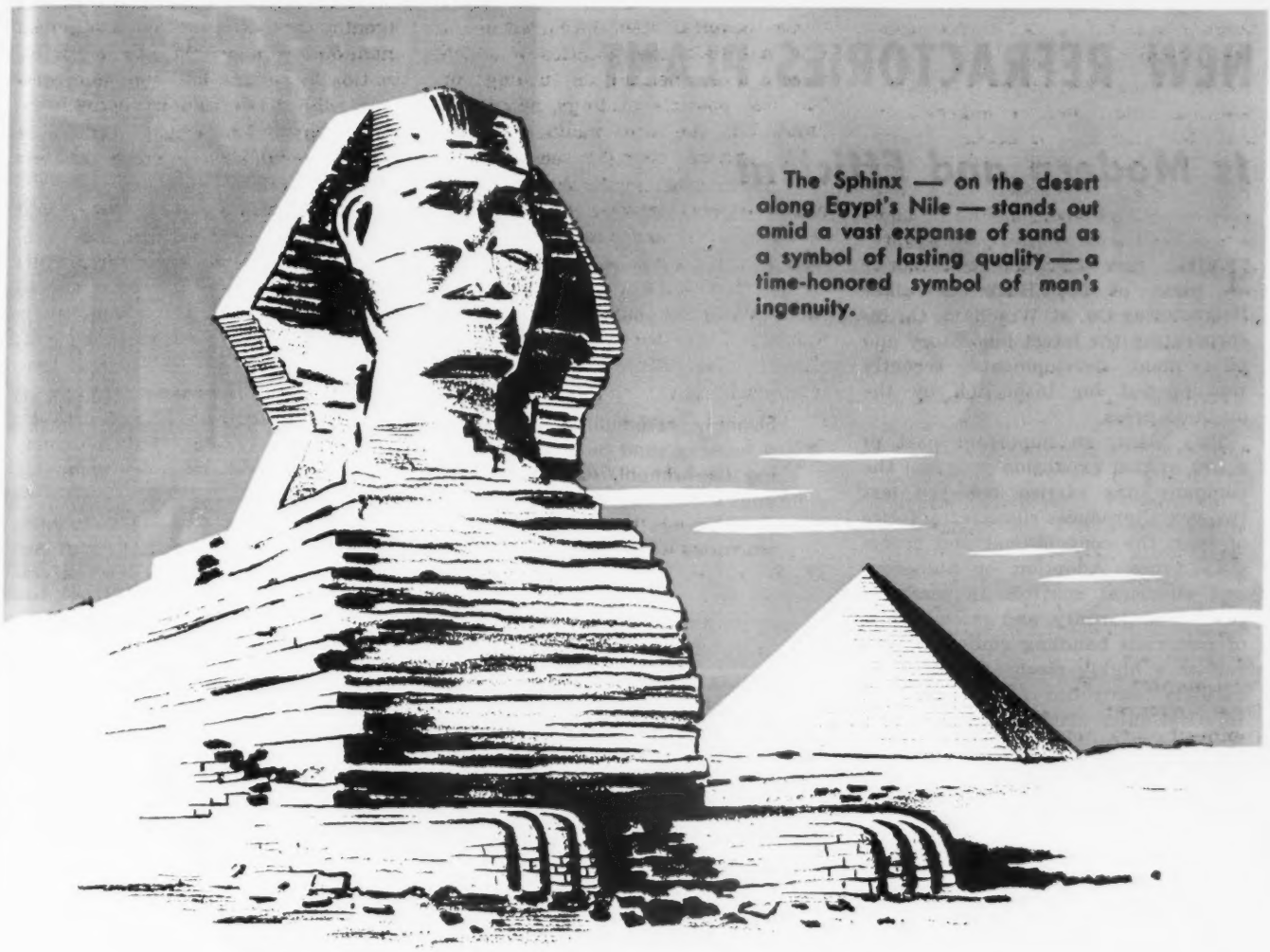
Experimental production of titanium castings was discussed under the leadership of J. H. Jackson, director of the institute's research projects at Battelle Memorial Institute. Economic and strategic aspects of titanium in general and of titanium castings in particular were discussed by Dr. M. G. Fontana, who supervises institute research at Ohio State University. Shell molding was discussed by H. J. Cooper, Cooper Alloy Foundry Co., Hillside, N. J.

G. A. BAKER
President, ACI

In addition to these papers, reports on progress of the institute's current metallurgical and foundry research in the high-temperature and corrosion fields were made by N. A. Matthews, American Brake Shoe Co., chairman of the technical research committee, and by W. T. Bryan, Duriron Co., chairman of the shop practice committee.

New officers of the Alloy Casting Institute were elected at the annual meeting. G. A. Baker, vice president, Duriron Co., Dayton, O., was elected president. Mr. Baker served as vice president of ACI last year and has had wide experience in every phase of the high-alloy castings field. He succeeds H. T. Harrison, executive vice president, Duraloy Co., Scottdale, Pa. C. K. Lockwood, vice president, Stainless Steel and Alloys Division, Shawinigan Chemicals Ltd., Montreal, was elected vice president, and E. A. Schoefer, Mineola, N. Y., was re-elected executive vice president and treasurer.

K. E. Fitz, Babcock and Wilcox Co., Barberton, O., and Thomas Rutherford, Midvale Co., Nicetown Philadelphia, were named to the institute's board of directors.



The Sphinx — on the desert along Egypt's Nile — stands out amid a vast expanse of sand as a symbol of lasting quality — a time-honored symbol of man's ingenuity.

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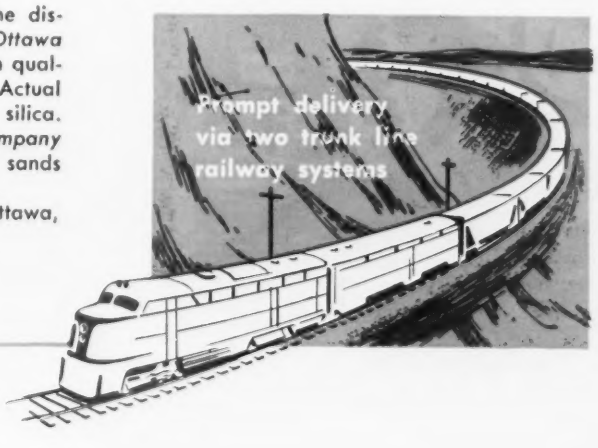

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NEW REFRACTORIES PLANT

Is Modern and Efficient

THE new silica refractories plant of the Harbison-Walker Refractories Co. at Windham, O., incorporating the latest laboratory and pilot plant developments, recently was opened for inspection by the business press.

This plant, an important part of a $30 million expansion program the company has carried out the last two years, produces silica refractories of both the conventional and superduty types. Adoption of numerous and electrical controls to maintain product uniformity, and extensive use of materials handling equipment, result in a highly mechanized and accurately controlled operation. It is the first silica brick plant built since Harbison-Walker introduced superduty silica brick during World War II as a new class of refractories.

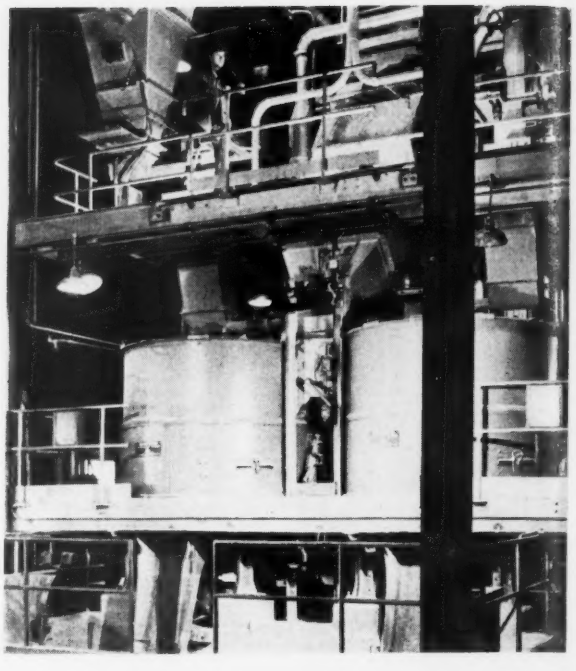
Raw material, a silica conglomerate rock taken from a quarry 6 miles away, is hauled by trucks to Windham where an apron feeder and bucket elevator convey it to bins. Lime, used as a binder, is unloaded from railroad hopper cars into a silo and later delivered to bins at the mixer by means of an air conveying system.

Fixed quantities of ground silica rock of different particle sizes are incorporated in the mix from which the refractories are formed, just as the foundryman controls the grain size distribution of his sand. The mixing operation is comparable to foundry sand preparation. Silica raw materials, water and binders are fed into foundry type mullers in a predetermined sequence, mulled for a fixed period, and the mixture discharged into tram buckets for delivery to the presses and stations where special shapes are molded.

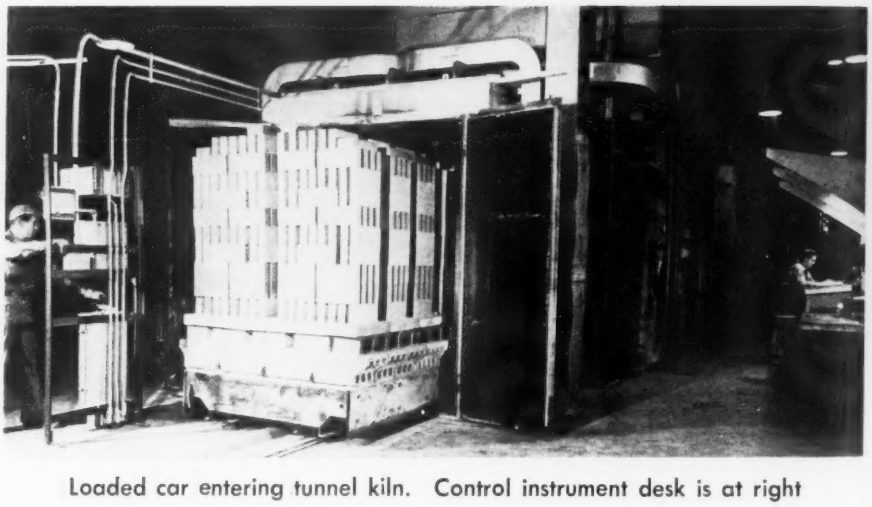
Most of the brick is formed by power presses. Some are made on an impact press which, in operating principle, resembles a foundry jolt machine, while certain special shapes are molded by hand.

Transfer cars and engine-driven pushers are used to move cars, on which press operators set standard sizes of brick, to tunnel dryers where the brick are dried before being fired in tunnel kilns. The kilns, 567 feet long, each hold 81 cars and have a

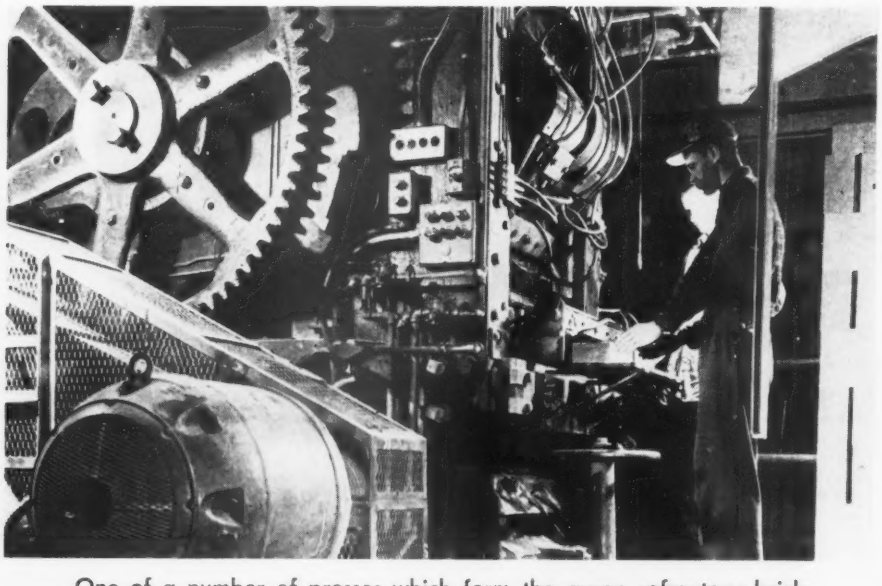
(*Concluded on page* 188)



Strongly resembling a foundry sand mixing department, the units shown here are used to mix the refractories materials



Loaded car entering tunnel kiln. Control instrument desk is at right



One of a number of presses which form the green refractory brick

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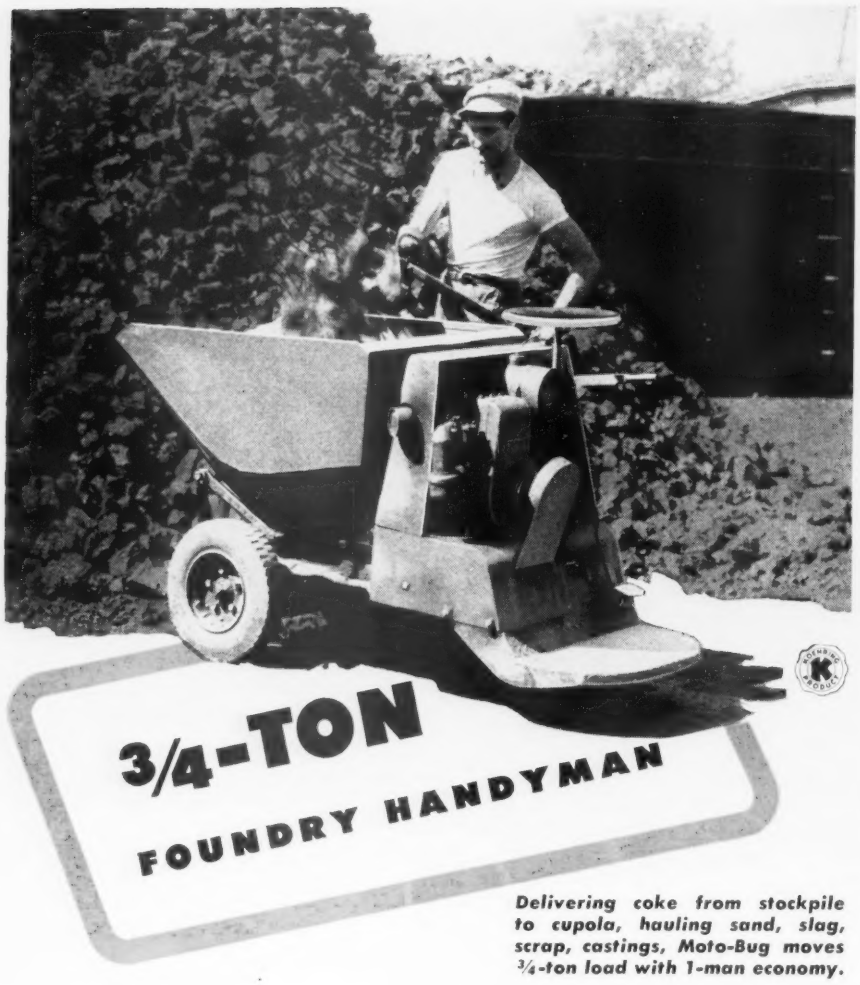

Delivering coke from stockpile to cupola, hauling sand, slag, scrap, castings, Moto-Bug moves ¾-ton load with 1-man economy.

On any material-handling operation, where you are now using ordinary wheelbarrows or hand trucks, Kwik-Mix Moto-Bug can show substantial savings in time and labor. This low-cost power wheelbarrow carries up to ¾ ton in big 10 cu. ft. (struck) hopper, easily triples output per man.

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KWIK-MIX (Koehring Subsidiary) "NO PUSH — NO PULL" Moto-Bug

(*Concluded from page* 186)

load cross section of 6 x 5 feet. The plant also has two round periodic kilns for firing large and intricate special shapes. Rack cars suspended from a monorail are used to handle shapes through the dryers prior to firing.

Refractories plants, like foundries, face a difficult dust control problem. At Windham an extensive system of dust control equipment is employed, part of it collecting dust from the raw material processing facilities and the other controlling dust generated in grinding. Portable high-vacuum units take care of general clean-up throughout the plant. The result is an exceptionally clean atmosphere.

As further protection of workers the plant has adopted powdered aluminum prophylaxis as a silicosis preventive. These aluminum inhalation treatments are available weekly to every employee and are administered at the plant clinic by a full-time registered nurse under the supervision of the company physician. Harbison-Walker first inaugurated this program in 1943 at another plant and was the first industrial organization in the United States to be licensed by the McIntyre Research Foundation, Toronto, Canada, to administer the aluminum prophylaxis treatment.

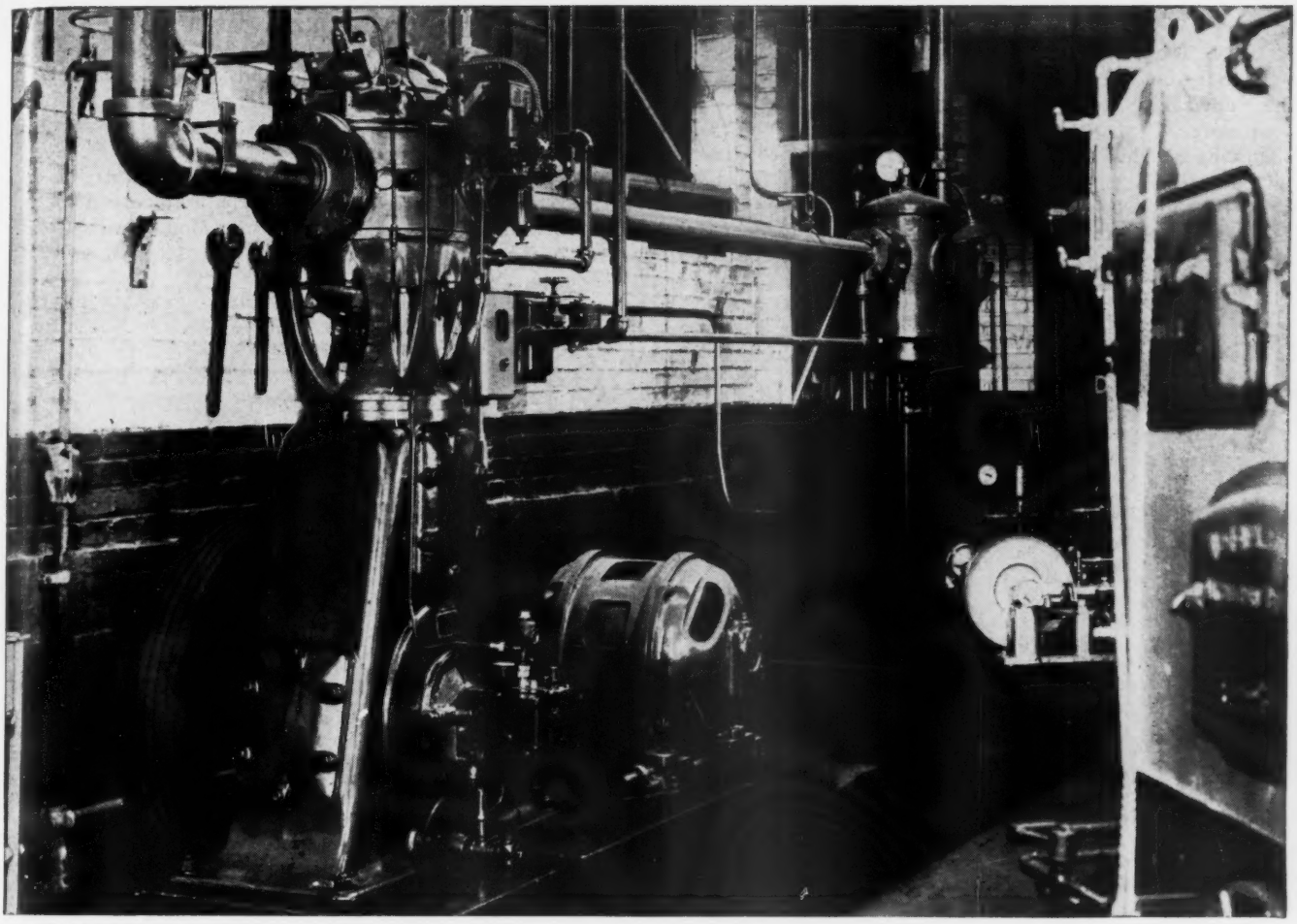
Book Review

Giesserei, Sonderausgabe, Konstrukteur und Giesser (Foundry, Special Issue, Designing Draftsman and Molder), 88 pages, 8¼ x 11¼ in., published by *Verlag Stahleisen*, 1 August Thyssen Strasse, Dusseldorf, Germany.

The 12 articles in this booklet chiefly concern co-operation between drawing room, foundry and machine shop and should be helpful even to experienced designers. Gray iron, malleable iron, steel, copper alloy and aluminum castings are discussed.

Papers cover a variety of subjects. Some contain comparative data on pattern, molding, cleaning and machining costs. One shows original designs and the changes made in them on the basis of x-ray tests. Still others deal with permanent molds for light metals, with a comparison of castings and welded counterparts and with other topics. The bibliography contains 37 references, each of which is a review.

The book is abundantly illustrated, and most of the illustrations speak for themselves so long as the reader remembers that *falsch* means wrong and *richtig* means right.—*Prof. W. Trinks, Carnegie Institute of Technology.*



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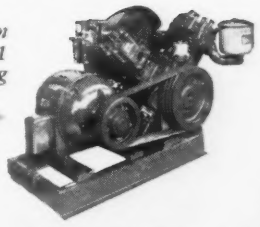
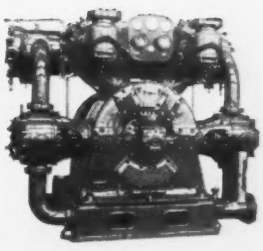
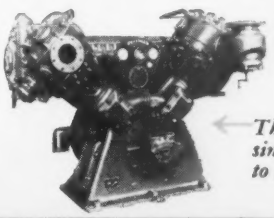
The JOY WL-80, in eleven sizes up to 641 CFM, with operating pressures to 125 psi.



The JOY WN-114, in single or twin units up to 7312 CFM.





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OBITUARY

JOHN HOWE HALL, 72, steel foundry consultant and member of the advisory staff of FOUNDRY, died Aug. 4 at Tarrytown, N. Y. Educated at Harvard University, he joined Bethlehem Steel Co., Bethlehem, Pa., in 1904 where he became assistant superintendent of the crucible steel department. In the summer of 1906 he was with Buffalo

JOHN HOWE HALL

Crucible Casting Co., Buffalo, N. Y., and in December became associated with Taylor-Wharton Iron & Steel Co., High Bridge, N. J., where he remained until 1937 with the exception of 1913 and 1914 when he practiced as a consulting metallurgist in New York. In 1937 he resumed consulting practice, interrupting this from 1942 to 1945 to act as assistant metallurgist for General Steel Castings Corp., Eddystone, Pa.

During his career Mr. Hall was responsible for a number of foundry developments. He was the first to use intermediate manganese steel for castings, and introduced the practice of quenching and reheating alloy steel castings. He developed a method for pouring small alloy steel castings directly from the high-frequency electric furnace without interrupting the power, and substitutes for silica sand to obtain smooth surfaces.

Mr. Hall was an honorary life member of the American Foundrymen's Society and a member of American Society for Metals, American Society for Testing Materials, American Institute of Mining and Metallurgical Engineers, British Iron and Steel Institute, and Electrochemical Society. He was author of *The Steel Foundry* as well as numerous papers on steel foundry practice. He was first recipient of the J. H. Whiting Gold Medal of the AFS in 1924; presented the Henry M. Howe Memorial lecture of the AIME in 1929, and the Charles Edgar Hoyt annual lecture of the AFS in 1949.

* * *

Walter J. Hanson, 67, president, Allis Foundry Products Inc., Milwaukee, died July 26. Mr. Hanson was with Federal Pressed Steel Co., and Seamless Steel Products Co., former Milwaukee firms, until 1931 when he acquired Allis Mfg. Co. and began production of nonferrous castings under the name of Allis Foundry Products Inc.

* * *

James V. Proshek, 79, founder and until his retirement in 1949, president, Cuyahoga Foundry Co., Cleveland, died July 19. Mr. Proshek began his molder's apprenticeship at the age of 13. He founded his own company in 1921.

* * *

Max Kuniansky, 54, executive vice president, Lynchburg Foundry Co., Lynchburgh, Va., died July 21. Mr. Kuniansky was born in Russia and came to America in 1907. He attended Atlanta public schools and was graduated from Georgia Institute of Technology in 1919. Early associations included Aetna Explosives Co., now Hercules Powder Co., and American Cast Iron Pipe Co., Birmingham; and National Malleable & Steel Castings Co., Chicago. He

MAX KUNIANSKY

joined Lynchburg Foundry in 1923, successively filling the positions of chief chemist, works manager, and vice president-general manager, becoming executive vice president in 1951.

Mr Kuniansky was known internationally for his contributions to the advancement of castings industry technology, particularly in the field of gray iron metallurgy. A member of the American Foundrymen's Society since 1921, he was awarded its William H. McFadden Gold Medal in 1941, in recognition of his contributions to the association and to the industry. He was vice president and member of the executive committee of the AFS in 1946-47, president 1947-48, and upon completion of that office was awarded a life membership in the association. Mr. Kuniansky was a member of the board of trustees, Gray Iron Research Institute, a director of Gray Iron Founders' Society, and served on the Mobilization Committee on Iron and Steel Scrap.

* * *

H. M. Stoneham, plant superintendent, Kay-Brunner Steel Products Inc., Alhambra, Calif., died July 15. He joined the company in 1925 as a salesman.

* * *

Fred Kalmbach Sr., founder and chairman of the board of Emmaus Foundry & Machine Co., Emmaus, Pa., died July 31.

* * *

Carl F. Erickson, 69, founder and owner, Arrow Pattern & Foundry Co., Chicago, died July 13.

Develop Course for Fork Lift Truck Operators

A new method of training fork lift truck operators has been developed by Yale & Towne Mfg. Co., Philadelphia. The course consists of lessons which can be grouped together as a full plan of instruction or presented in parts, each section an individual whole in itself. Section one describes the operation of gasoline, diesel and electric trucks, from starting the engine to expert operation. Section two provides information on preventive maintenance for all three types of trucks and gives practical daily, weekly, monthly and annual checklists. The third section, called "Let's Play It Safe," uses an instructive cartoon technique to elucidate safety problems in handling fork lift trucks and their loads.

Magnaflux Corp. Occupies New Plant and Office

Magnaflux Corp., Chicago, has occupied a newly built plant, nearly twice the size of its former main building, which combines under one roof operations previously carried on in two separate plants and through subcontracting. Located at 7300 West Lawrence Ave., Chicago, the new plant and main office is on a 9-acre site that will allow room for future growth.

The 74,000 sq ft in the 1-story building are divided about 65 to 35 per cent between manufacturing area and research, engineering and field engineering service functions.

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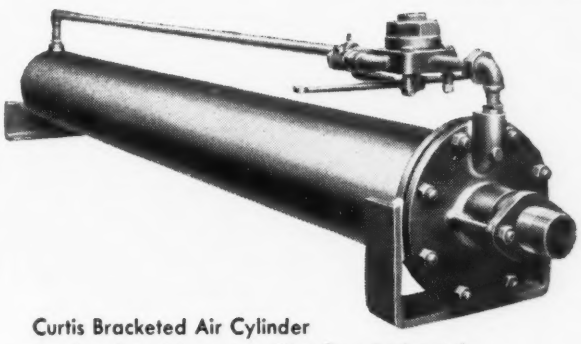

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Foundry Developments

By EDWIN BREMER

INVESTIGATION by Dennison and Tull of grain refinement of cast copper-aluminum alloys, as reported in the July issue of the *Journal* of the Institute of Metals (London), shows that addition of 0.01 to 0.03 per cent boron eliminates columnar crystal growth and forms equiaxed crystals. Tensile strength and elongation also are increased. Grain refinement produced by boron additions is said to be practically unaffected by repeated melting and casting, indicating that loss of boron is negligible. Experiments on a cast hard 14 per cent Al-5 per cent Fe alloy used for die blocks which have an all-beta phase structure and columnar structure exhibited a completely equi-axial structure when 0.01 per cent B was added to the melt. Castings were in form of a hollow cylinder, 14 in. OD, 8 in. ID and 6 in. high.

* * *

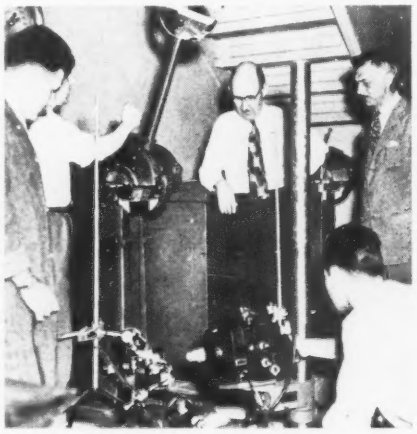
SIMPLE apparatus for routine fluidity testing to control misrun castings is described in an article "Fluidity Test for Quality Control in the Foundry" by T. P. Yao in the May 21 issue of *Foundry Trade Journal* (London). Device is a miniature spiral with a semicircular section of $\frac{3}{16}$-in. diam and ¼-in. spacing which is molded in a bushing or flask 3 in. and 3½ in. in diam. The spiral is 3 in. in diam, requires 1.2 lb of metal, 5 lb of sand, and takes 3 to 5 minutes to mold. Tests with the miniature spiral show that the fluidity of gray iron varies linearly with the casting temperature in the working range above 2282° F; that there is a parabolic relationship between the fluidity and both the ferrostatic head and the rate of pouring, and an increase in moisture content of the molding sand tends to reduce the fluidity.

* * *

CAST spheres to contain magnetometers used for magnetic measurements conducted by the Danish deep-sea expedition in the ship *Galathea* had to withstand water pressure at great depths and be completely non-magnetic. Calculation showed that material for the sphere must have a yield strength in compression of at least 39,800 psi. None of the existing casting alloys proved suitable, and according to Borge Lunn in the June, 1953 issue of the *Journal* of the Institute of Metals (London), a special alloy was developed containing 62 per cent Cu, 5 per cent Al, 2 per cent Mn, 0.5 per cent Cr, and remainder Zn. Yield point in compression was 54,000 psi, tensile strength 99,500 to 113,700 psi and elongation 10 to 20 per cent. While alloy was very susceptible to stress corrosion no trouble was encountered due to intermittent exposure to seawater and short-time immersion. Spheres had a wall thickness of 4 in., and a finished weight of 2500 lb.

* * *

DEVELOPMENT of easily portable photographic equipment as well as special high-intensity light source generating little sustained heat permits high-speed photography to be accomplished in the field instead of only in the laboratory, according to



Sam Tour & Co. Inc., New York. In this type of photography, 16-mm film is exposed at speeds up to 3000 frames per second; frequently such pictures are the only feasible means of observing and analyzing the action of rapidly-moving machine parts and other bodies while in motion. Accompanying illustration shows operators setting up equipment for a study of what occurs during an impact test on a casting specimen.

* * *

INGENIOUS tube, the "gastroscope," used by physicians to examine the interior of a man's stomach, now is being employed in industry to inspect the inside of cavities difficult to examine otherwise. Industrial version called the "Inspectroscope", the tube can enter a ½-in. opening. It is equipped with a complex set of tiny lens, and as many as 60 of those small precision lens reflect the image back and forth to the inspector's eye. A strong light illuminates the area being looked at. Control wheel on the handle of the instrument permits the tube to be curved around corners. Device is made by Eder Instrument Co., Chicago.

* * *

DESCRIBED in the June issue of *Journal of Research and Development* of the British Cast Iron Research Association is an interesting device for mechanical clamping of shell molds. It consists of two hollow chambers, one fixed and the other movable through an air cylinder with piston, mounted opposite each other. Opposing faces of the hollow chambers are drilled and reamed in a regular pattern with an equal number of holes. Into the holes freely sliding steel pins with retainers are fitted; fit need not be accurate providing the bearing surface is sufficiently long to prevent rocking. The two chambers as well as the air cylinder are connected to a normal compressed air supply—a one-way restrictor valve being placed in the chambers' line.

In operation the movable chamber is brought forward with the pins retracted and a complete shell mold placed between the two sets of pins. Valve to the chambers is opened and the pins move forward and adjust themselves to the contours of the shells—each pin giving the same thrust which is proportional to the cross-sectional area of the pin and the air pressure used. At this point the mold is locked rigidly together and the mold is filled with metal.

* * *

NATIONAL Bureau of Standards, Washington, has developed load calibrating devices of unusual size and capacity which will permit standardization of the largest materials testing machines in existence. These dynamometers, of which four of 3 million-lb capacity each have been completed recently, make use of attached wire-resistance strain gages as part of their load-indicating systems. Prior to development of these instruments the highest load which could be measured accurately was about 2½ million lb by simultaneous use of a considerable number of proving rings of 200 and 300-thousand lb capacity.

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ANNUAL BRITISH FOUNDRY CONFERENCE

Papers Cover Wide Variety of Subjects

By VINCENT DELPORT
European Manager

FIFTEEN papers were presented at the technical sessions of the recent 50th annual conference of the Institute of British Foundrymen. Two of these dealt with shell molding methods; one was the exchange paper from the American Foundrymen's Society and the other was based on experience in Great Britain.

The American exchange paper was by Bernard N. Ames, supervising physical metallurgist, material laboratory, New York Naval Shipyard. Called **Survey of the Shell Molding Method of Casting Production,** the paper summarizes and surveys the shell molding process and is based primarily on data developed in research and production activities at the New York Naval Shipyard.

Data are included on the mechanics of the process, metallurgical evaluations of the process, mechanization, plant safety, dimensional tolerances, gating and heading, applications and economics. Mr. Ames concluded that, properly used, the shell molding process is an economical foundry technique which permits the utilization of lower grade skills, frequently improves metal yield, and reduces machine shop time and cleaning costs.

In the British paper, **Shell Molding Process,** D. N. Buttrey Imperial Chemical Industries Ltd., the author, stated that in Great Britain the transition of the process to a production scale has been slower than in the United States. A limited number of foundries are using the process, and considerable developmental work is being done at present.

Satisfactory techniques for producing shells now have been established. Difficulties of separating shells from patterns have been resolved by the introduction of silicone separating agents; other satisfactory separating agents based on waxes, organic greases and polymers are now available also. A technical background to the process, is being built up covering such factors as the influence of sand particle size on finish and strength of shells, the effect of pattern and oven temperature on shell buildup and hardening rate, the properties of different patternmaking materials and the suitability of the process for the casting of various metals.

The shell molding process offers distinct advantages for many types of casting over conventional foundry techniques, he said, the most notable being superior finish, closer as-cast tolerances, greater ease of casting thin sections, reduction of "blowing" in castings and reduced finishing costs in the form of savings in cleaning. At present, development is being concentrated on improved resin binders for making the shells, mechanization of the process, investigation of casting sizes possible by the process and the suitablity of the process for casting ranges of metals.

The two papers were discussed together, and it was found that, in general, practice in the United States and in Great Britain did not differ much except in details. An exchange of experiences took place between speakers, the principal points raised including the use of silicones versus other agents to separate the shell from the pattern; composition of the materials constituting the shell; pattern and oven temperatures and investment times. No conclusions of a definite nature were arrived at, but the pooling of information helped to achieve a better understanding of the method and to encourage further progress.

The question of costs was raised, and it was agreed that the cost of raw materials was not the only factor to be considered, but should be set against savings realized in other directions and against certain other definite advantages of shell molding. The consensus was that the shell molding process will not displace conventional methods but has made for itself permanent places where its use is specially called for.

Three papers dealt with gray iron. D. Fleming, metallurgist and foundry technician, Textile Machinery Makers Ltd., Oldham, contributed a paper on **Inter-relation of Combustion and Metallurgical Reactions in the Cupola.** The author suggests an ideal for soft gray iron melting and claims that the necessary control can be obtained through a combination of hot blast, water cooling, and continuous tapping. He further claims that such a cupola should allow economical production of soft gray iron without the need for pig iron, should supplies of ferroalloys and iron and/or steel scrap be available. Controlled metallurgical treatment of the raw materials is a condition of success.

A contribution by J. R. Charlton, works manager, Wear Winch Foundry Co., Sunderland, was entitled **Production of Diesel Engine Castings in Gray Iron.** The paper describes the methods adopted in the production of iron castings for diesel engines in a jobbing foundry. Mr. Charlton's firm was originated in 1907 and then employed one man and a boy on the manufacture of winches and reels. Subsequently, a small foundry was established to produce the castings used in these products. This steadily developed and is now a modern foundry with three bays occupying 24,000 sq ft which employs well over 100 people and produces a wide range of engineering and shipyards castings weighing up to 25 tons each.

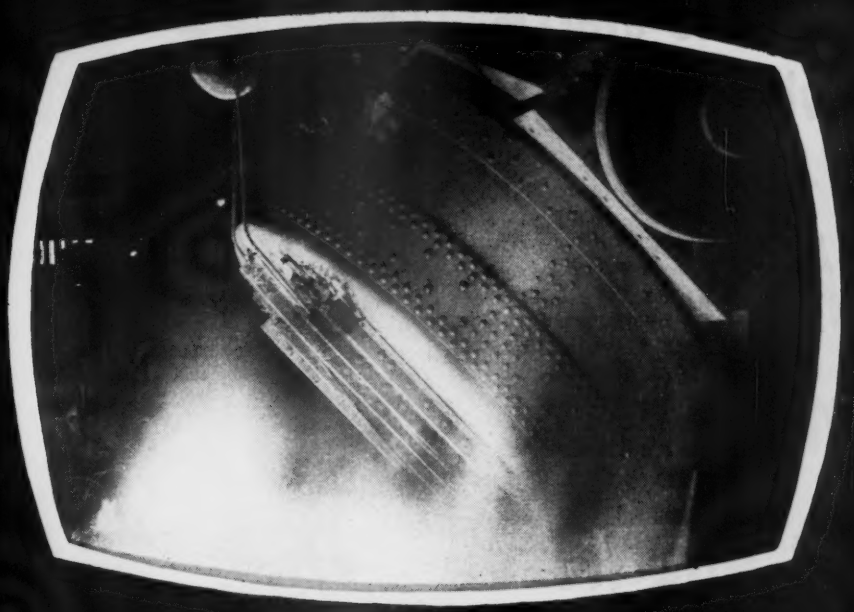
Growth Characteristics of Ingot Mold Irons in Air and Vacuum was the title of a paper by J. W. Grant, British Cast Iron Research association. Growth of cast irons has been attributed mainly to three causes: Carbide decomposition oxidation, and bursting or cracking by expansions and contractions during the alpha-gamma transformations. The author studied oxidation products and growth of ingot mold irons caused by long heat treatment at 500°C in air and and by repeated heating at 650-900-650°C in air and vacuum.

In the vacuum tests, growth of as-cast and vacuum-annealed ingot mold iron continued at a fairly uniform rate according to the number of heatings. A volume growth of 80 per cent was obtained after 300 heatings. Pure iron/carbon and pure iron/aluminum/carbon specimens that were melted, cast and tested in vacuum grew 44 and 153 per cent respectively after 300 heatings and were still continuing to grow. Annealing in air inhibited growth due to repeated heating in vacuum. The growth after 300 heatings in vacuum was completely arrested by annealing in air at 700°C for 20 hours. The work gives strong support to the cracking theory. Annealing in air appears to cause a protective envelope to form around the graphite. This envelope prevents the solution of graphite in the gamma iron at the austenizing temperature and thereby diminishes the intensity of the expansions and contractions during the alpha-gamma transformation.

A contribution on steel casting was made by Charles W. Briggs, techni-

(Continued on page 196)

telling the story of 'dag' dispersions



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With the new method, metal castings produced in Durez resin bonded shell molds conform to required dimensions very closely, and have such smooth surfaces that in some cases machining is eliminated completely. One large casting that formerly required 27 pounds of metal removal per piece now needs less than three.

Success depends largely on the bonding resins. Working with leading foundries from the start, Durez has perfected a phenolic resin with exceptionally fast cure and rigid set. The resin facilitates mass production and makes it easier to obtain castings with desired qualities of structure, dimensional accuracy, and finish.

This is one way in which Durez — leading specialists in phenolics — has contributed through research to industrial advance. Others are in the fields of abrasives, rubber, wood waste utilization, paper products, printing inks, wax emulsions, and of course, plastic molding compounds.

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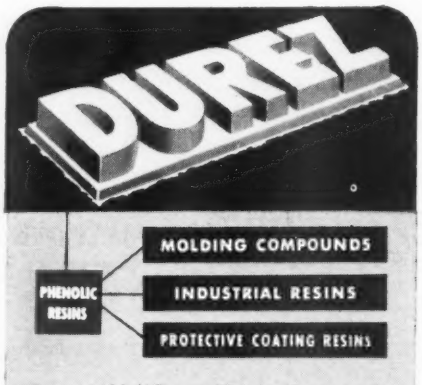

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PHENOLIC PLASTICS THAT FIT THE JOB

(*Continued from page* 194)

cal and research director of the Steel Founders' Society of America, and Howard F. Taylor, Massachusetts Institute of Technology. This report was prepared from a research study carried on at MIT for the Steel Founders' Society. The authors reviewed principles established by earlier work on feeding and measuring efficiency. They then described apparatus and applications which allow gas pressures above atmospheric to be applied to freezing castings. One section concerned temperature effects independent of pressure.

From their conclusions it appears that no dependable improvement in feeding efficiency, as evidenced by casting quality or increased yield, was found as a result of using gas pressures in excess of atmospherics. Where isolated successful cases occurred, low gas pressures from 3 to 50 psi were found more beneficial than higher gas pressures. The rate of application of gas pressure is extremely critical, too much so to accommodate use of a "pressure capsule" to any practical advantage. Control of temperature gradients remains the paramount consideration in making sound castings, with or without the use of gas pressures.

Among three contributions on nonferrous castings was a report from subcommittee T.S. 38 of the technical council of the institute, on **Economic Utilization of Copper Base Alloys.** The terms of reference were as follows: "Acute shortages of nonferrous materials having emphasized the need to avoid waste of valuable raw materials, the subcommittee was appointed in March, 1951, 'to investigate the properties obtainable in copper base alloy castings having regard to the economical utilization of metals.'"

The report draws the attention of foundrymen to the following points: The use of special techniques; the use of British Standard alloys; the need for knowledge of the properties obtainable in castings; foundry control. Recommendations to the users of castings include the need for collaboration with the foundryman at the design stage; the need for knowledge of the strength of castings; the need to reduce sections or use stronger alloys whenever possible; and the desirability of using die castings when suitable.

Dr. W. T. Pell-Walpole contributed a paper entitled **Effect of Pouring Conditions on Shrinkage Unsoundness in Bronze Ingots Cast in Metal, Carbon or Sand Molds.** This paper first enunciated and then explained the fact that shrinkage porosity of gas-free bronze is related to the rate of

(*Continued on page* 198)

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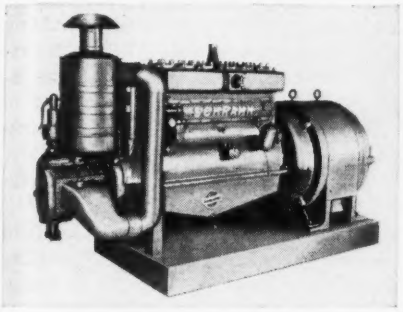
NEW SUPER-*Unistage* Air Compressor Offers Many Advantages

Schramm, Inc., makers of air compressors for 54 years, announces the newest in its line — a 600 c.f.m. industrial model, the Super-*Unistage*. Major advantage of this compact, vibrationless unit is its super-charge design, which puts it in a class all by itself and answers the industry's demand for such a model.



Noteworthy advantages are offered by the Super-*Unistage*. For here has been designed a large capacity compressor which at the same time is compact, vibrationless, adaptable to the unit-system installation whereby multiple power can be provided by operating the series of units, or a single or several units when peak air loads are not required.

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Before purchasing any air compressor, it is quite natural to investigate its purchase price, maintenance, upkeep and installation costs. Here, in one package, you have the answer to your search for economy.

Its price is in keeping with the air it supplies . . . there is practically no installation cost since no elaborate foundation is required . . . and its maintenance is low.

Features

The Schramm Super-*Unistage* is a 150 h.p. six cylinder model having mechanically operated intake valves with the patented Schramm intake valve unloaders, large diameter cushioned low lift discharge valves, seven main bearing crankshaft with pressure lubrication to all bearings.

The unit is available with either an intercooler of a tubular type heat exchanger, with the water passing from the intercooler through the compressor jackets (as shown in illustration) or with the Schramm cooling unit, radiator type, in which the intercooler is an air-cooled unit with fan.

The model illustrated has 440 volt, 3 phase, 60 cycle, low starting current, normal torque, induction motor. Also, 208, 220 or 550 volt induction motors are available at the same price.

Other features make the unit notable.

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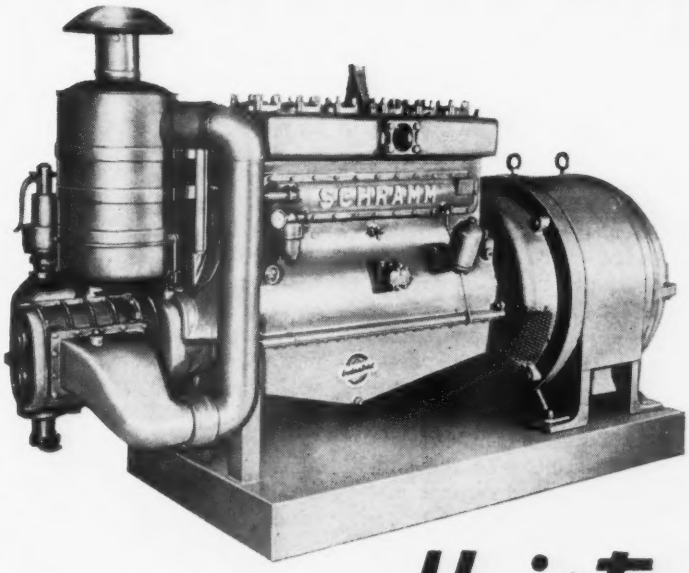

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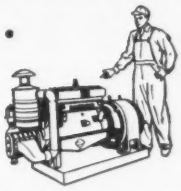

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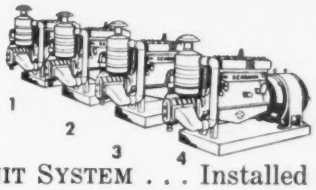

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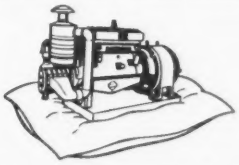

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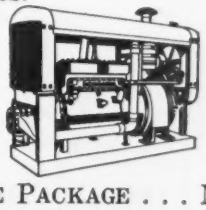

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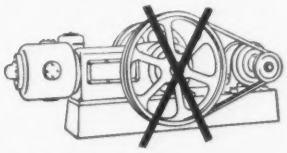

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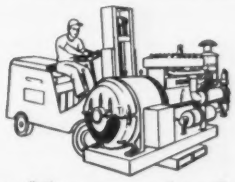

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(*Continued from page* 196)

pouring. Next, details were given of new research work carried out to determine the effect of both rate and temperature of pouring of bronze cast into molds of widely differing thermal characteristics. From data so acquired, optimum pouring rates to suit the various conditions have been developed. Their application to foundry practice generally was discussed.

A paper by J. Taylor, Z. Stokowiec and R. S. Jackson was on **Difficulties in the Production of Centrifugally Cast Nickel-Bronze Bearing Shells.** Shells for babbitt metal-faced diesel engine bearings were produced as castings in a leaded nickel-bronze alloy by the horizontal-axis centrifugal method. The occurrence of pinholes in the facing was traced to slight porosity in the base metal. During the melting process, gases, whether trapped in the pores or derived from the flux, formed bubbles in the babbitt metal which, on subsequent machining to the finished size, left depressions in the surface. It is believed that this interdendritic porosity in the backing metal is due to gas evolution in the later stages of the solidification of the copper/nickel/tin matrix and that this gas forces the lead, which is still liquid, out of the regions in which the evolution occurs.

Methods of preventing the original solution all proved unsuccessful. Other modifications to the process, including changes in the pouring temperature and speed of rotation of the casting machines, had little effect. It was found that by careful adjustment of the conditions of cooling. it was possible to eliminate the porosity entirely and to reduce the segregation due to microbanding to negligible proportions.

Light alloys were dealt with in two papers. Marjorie Whitaker, British Non-Ferrous Metals Research Association, presented **Mold Reaction in Aluminum Alloy Castings.** The author stated that aluminum alloys containing magnesium react with the moisture in the mold when they are cast in sand. The reaction increases with increasing magnesium content and with solidification time. It therefore is greatest in heavy sections of alloys with high magnesium content. The reaction may result in severe and often deep oxidation of the casting surface and in absorption of hydrogen. The hydrogen thus absorbed is liberated within the casting during solidification, causing porosity.

This paper is a summary of ten years of experimental foundry work on problems related to the inhibition of the reaction. It is largely concerned with 90/10 aluminum-magesium alloy. Measurements showed that gas porosity was concentrated beneath the surface and decreased rapidly toward the interior. The reaction was not prevented by drying the mold, nor did the addition of various corebinders have any effect on it. It was found that additions of beryllium largely inhibited this reaction, a 0.004 per cent addition of this element being most effective.

This addition by itself was found adequate for thin sections up to 1 in. in diameter or for about ½-in. plate thickness, provided contamination with sodium was avoided. For thicker sections, an inhibitor in the molding sand is necessary also. With the addition of boric acid or ammonium bifluoride to the sand, sections up to 4 in. in diameter or 2-in. plate thickness can be made sufficiently free from mold reaction for most practical purposes.

Modification of High-Silicon Aluminum Alloys and the Corresponding Structures was the title of a paper by Claude Mascre, Centre Technique des Industries de la Fonderie, Paris. This was the official French exchange paper. It dealt with the action of phosphorus and sodium on hypereutectic aluminum/silicon alloys.

The results of tests allow the postulation of the following conclusions: Phosphorus reacts on aluminum to form particles of aluminum phosphide which play the part of nuclei of crystallization for the silicon; the fineness of the resulting structure attains its maximum for an addition of 0.01 per cent of phosphorus, and this is associated with higher mechanical strengths. Sodium, by increasing the viscosity of the liquid aluminum changes the silicon crystals from a geometric form first to one of a dendritic character and then to a globular form. These structural modifications reduce the mechanical strength of the alloy.

The four remaining papers dealt with miscellaneous subjects. **Effects of Mold Resistance on Internal Stress in Sand Castings** was the title of a contribution by Dr. R. N. Parkins, lecturer in metal'urgy, King's College, University of Durham, and Dr. A. Cowan, of the Ministry of Supply. The authors state that measurements on castings of simple shape indicate that the surrounding mold material may offer considerable restraint to the contraction of the casting as it cools and that the degree of restraint is, in general, related to the high temperature strength of the sand.

They inferred from this result that the common feeling that mechanical properties of the mold have little influence upon the formation of residual stresses is not always true, depending

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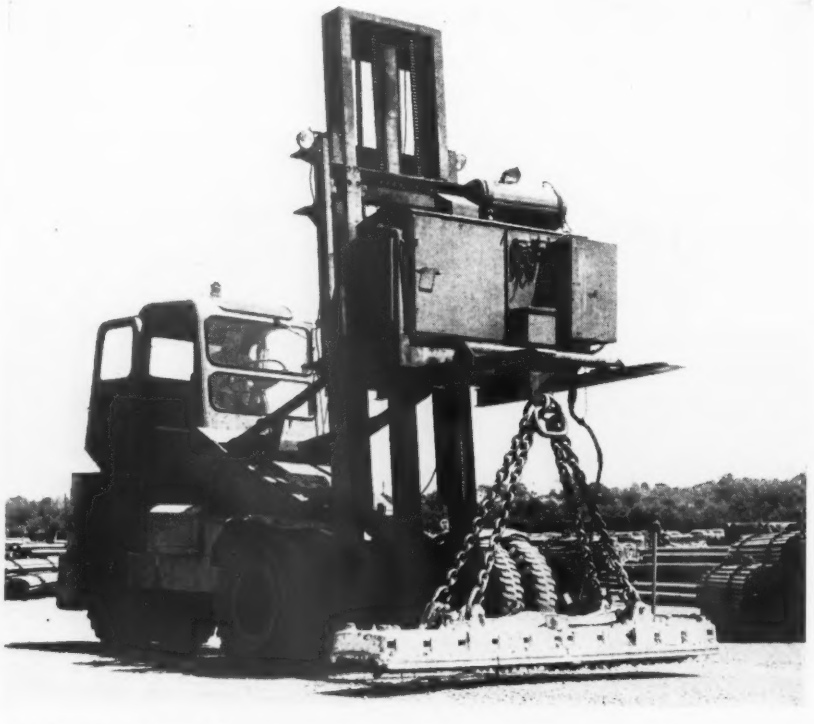

MAGNET-EQUIPPED fork lift truck is used to pick up metal debris on more than 10 miles of plant highways at the Timken Co.'s grounds, Canton, O. The roads are used extensively by pneumatic-tired equipment. Mounting of the 15 kw gasoline-driven generator and rectangular magnet on the fork truck, as shown in the view above, requires less than 5 minutes

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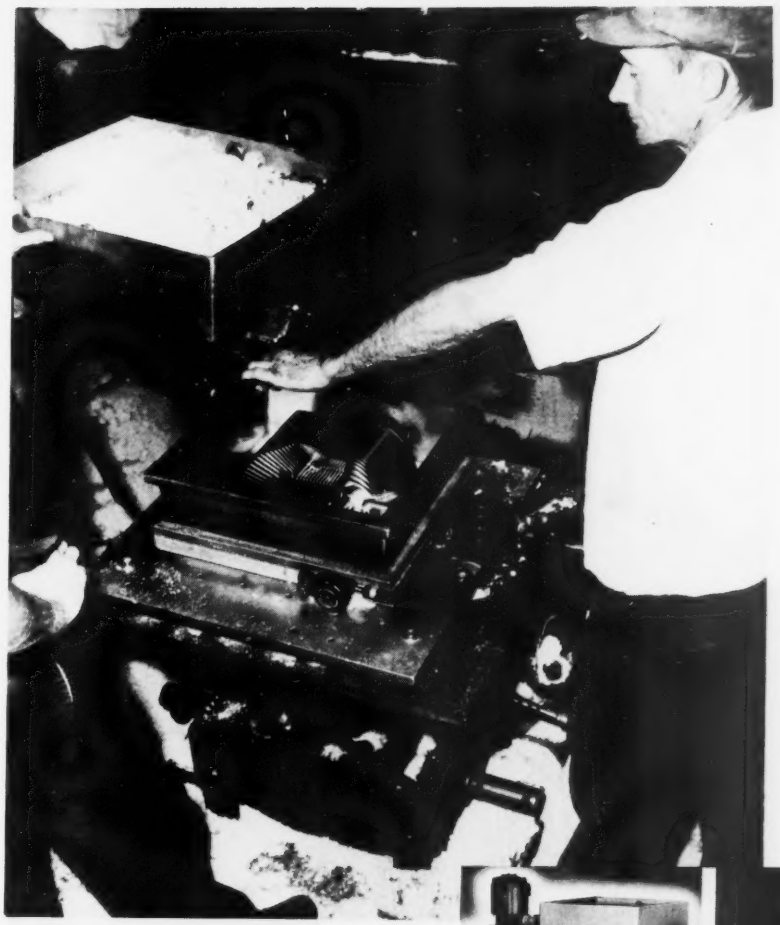
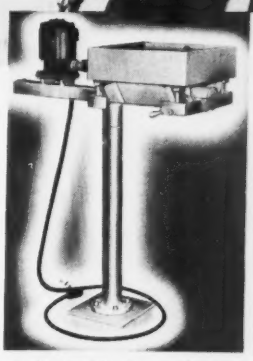


The extremely deep thin fins of this core box for an air-cooled aluminum cylinder head are difficult to fill. It's a job that requires very thorough riddling and yet the riddle must be fast and easy to operate. In other words the job *requires a Beardsley & Piper Roller Riddle.*

The Roller Riddle is mounted on a sliding frame and is positioned over flask or core box for riddling. When the job is done, the riddle is slid back out of the way. An automatic switch starts and stops the riddling action.

The Roller Riddle increases the productivity of molder or coremaker (up to 33%, users report) and also provides a higher degree of uniformity and improves surface quality of castings. You'll be pleasantly surprised at the Roller Riddle's low cost.

Sand for this difficult coremaking job is mulled in a Model "40" Speedmullor. The box is rammed on a Beardsley & Piper J & J 612 RP Jolt Rollover Molding Machine.



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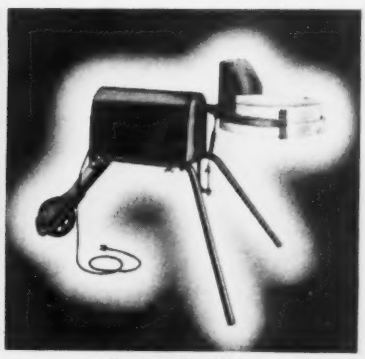

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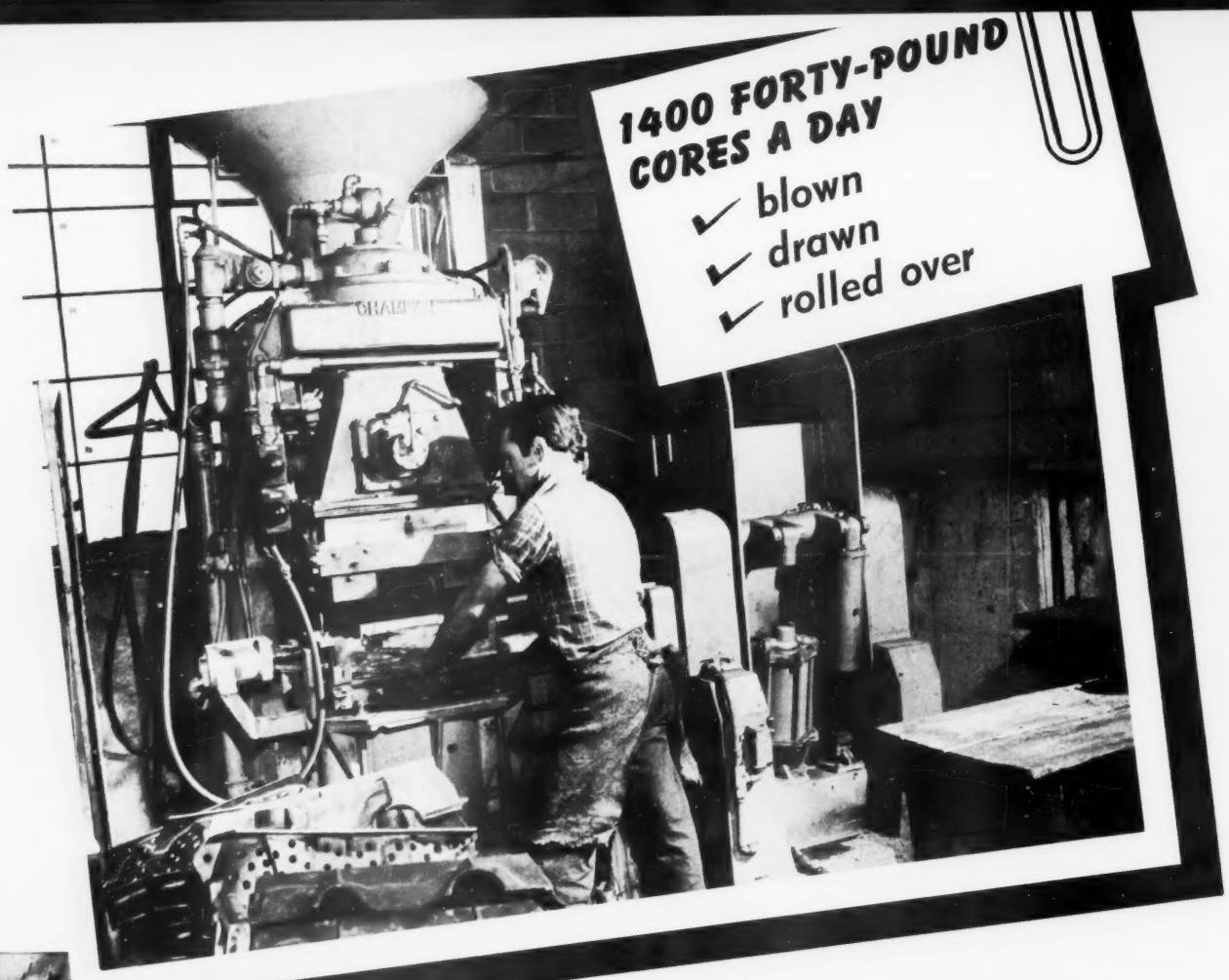


NEWNAM CHOOSES CHAMPION!

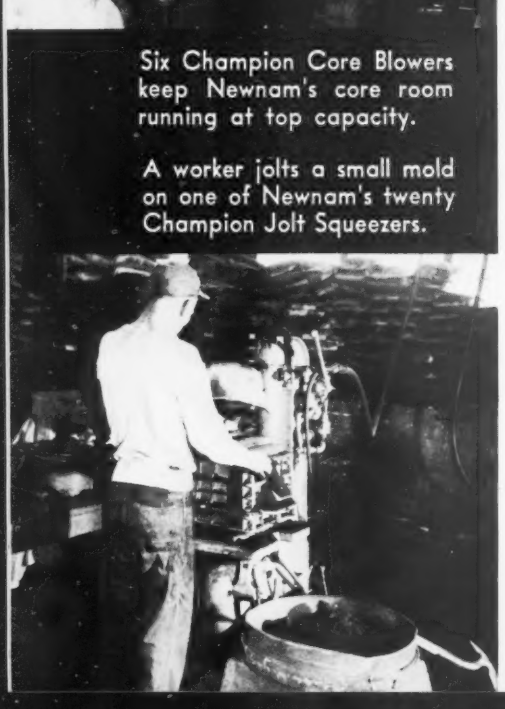
The Newnam Foundry Company of Kendallville, Indiana, had always been a "*Champion*" plant. Champion Core Blowers handle most of the foundry's coremaking jobs, and Champion Jolt Squeezers are the backbone of the foundry's molding department.

So satisfactory was the performance of these machines, that when a $500,000.00 fire destroyed the foundry, Newnam management chose Champion a second time in both the core room and the foundry. They were convinced by previous performance of Champion's superiority.

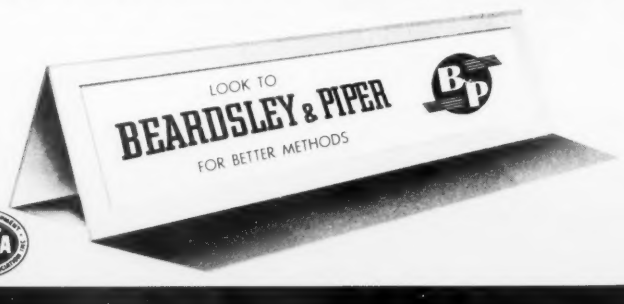
The latest installation at Newnam is a high production Champion Blo-Matic Rol-A-Cor Unit. 1400 forty-pound cores are automatically blown, drawn, and rolled over daily.

For your toughest core blowing jobs—choose Champion. You will find that these rugged Champion Blowers pay off in your core room, just as Champion Molding Machines pay off on your molding floors. Write today for specifications and prices. *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Illinois.*

Six Champion Core Blowers keep Newnam's core room running at top capacity.



A worker jolts a small mold on one of Newnam's twenty Champion Jolt Squeezers.



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upon the shape of the casting and the alloy concerned. An appendix showed that the stress remaining in a cast rectangular framework can be controlled to some extent by the use of a facing sand on various parts of the casting, with a grain-size distribution that results in close packing.

In a paper on **Foundry Developments in the Textile Industry** B. Gale, foundry manager, Howard & Bullough Ltd., dealt with the foundry production of castings for the machinery employed to manufacture yarns. He covered types of machines, foundry methods of production, past and present, and metallurgical aspects.

Effect of Heat on Clays and its Bearing on the "Life" of Clay Bonds was by S. Davison and Dr. J. White. The effect of heat on all clays ultimately is to destroy their bonding properties. This will always happen to the clay in a mold in the immediate vicinty of the mold/metal interface, where the temperature is high enough to decompose the clay completely and almost instantaneously. There also exists in the mold a much deeper zone, where the maximum temperatures reached lie between about 400 to 700° C, in which the time/temperature conditions are such the clays with different dehydration characterics may be expected to show appreciable differences in the degree of breakdown they undergo during a given cycle of use. This reasonably might be expected to be reflected in differences in the "life" of the clay bond under service. The object of the paper was to determine whether such a relationship between breakdown characteristics and "life" did in fact exist, and to ascertain to what extent such differences in behavior could be correlated with changes in the chemical and physical properties of the clays during heating.

Pelleted Foundry Pitch was a contribution by E. Brett Davies, T. F. N. Matthews and G. Smart.

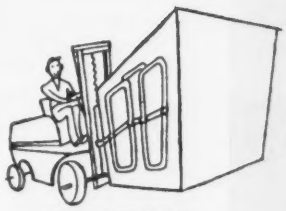
Book Review

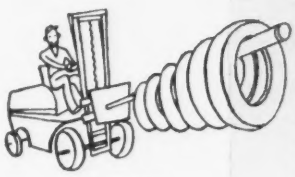
The Chemical Industry, paper, 108 pages, 6 x 9 in., published by Manufacturing Chemists' Association Inc., Washington. Price $1.

Subtitled a "Facts Book," this work is aimed at creating a wider understanding of how the benefits of the American standard of living have been spread through chemical progress. The volume points out that during the last 25 years, the fruits of an unprecedented living standard have been extended to practically all the American population, and it asserts that technology, nowhere better exemplified than in the chemical industry, has been the basis of this development.

Have You Explored All the Ways To Save Money With a Fork Truck?

WOULDN'T IT BE GOOD BUSINESS to know all the ways to save money with your Clark truck? It's the function of Clark attachments to transform your truck into a machine of *many* uses. Rather than let a truck stand idle for "lack of work," you can switch from one attachment to another in 10-20 minutes—go from one job to another, from partial idleness to *full-time* usefulness.


CARTON CLAMP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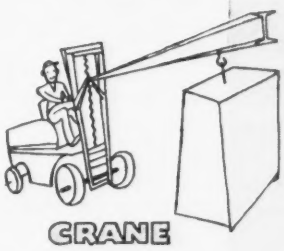
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ROTATING ROLL CLAMP

For example, why use manual labor to handle scrap, coal, sand or even cement? You'll do the job faster, more economically with one of Clark's shovel attachments. Why manhandle cartons, crates, rolls, drums, bales? Simply switch to the proper Clark attachment—there's one designed to handle practically any product or material. And for the relatively few cases where a standard attachment won't do the job, it's more than likely that our Custom Truck Department can design and build special equipment to solve the problem (—and inquiries are invited).

Perhaps you're hesitating to buy a fork truck because your principal handling job requires only part-time truck application. If that's the case, don't fail to look into this attachments angle. Chances are we've got, or can devise, one or more attachments that will enable you to utilize a fork truck profitably, all day long.

Your local Clark dealer (listed in the Yellow Pages of your phone book) will be glad to help you plan ways to multiply the usefulness of your Clark trucks and POWRWORKER hand trucks. Or if you prefer to use the coupon, we'll gladly send a brochure describing the Clark line of attachments.

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INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 16, MICHIGAN

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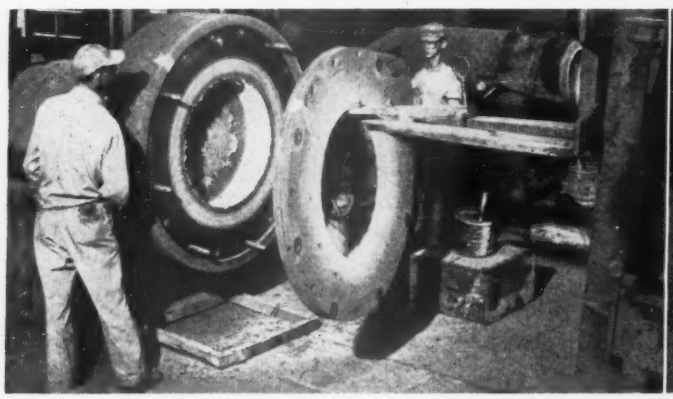
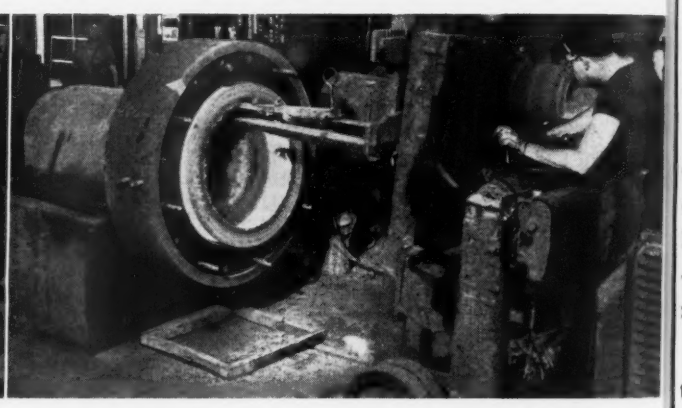
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

Molten metal is tapped from the furnaces and transferred to spinning mold of centrifugal casting unit

A heat-resistant alloy, incorporating nickel, tungsten and chromium, is melted in induction furnaces



Lifting off flange of centrifugal machine preparatory to removal of the casting from the metal mold



Fork truck is employed to lift out the solidified ring casting, which is then permitted to air cool

Jet Plane Parts Cast Centrifugally

OPERATING temperatures of nearly 2000°F in the engines of jet planes posed tremendous problems during the early stages of jet engine development.

In the search for suitable heat-resistant alloys from which to make essential engine components during World War II, Firth-Vickers Stainless Steels Ltd., Sheffield, England, also developed a casting process for producing such parts. Known as the "Centri-Die" process, it was kept secret for some time. Recently, however, Lebanon Steel Foundry, Lebanon, Pa., acquired the process for use in producing turbo-jet parts needed in the United States' expanding aircraft engine program.

Experience gained in the production of nearly two million high-alloy steel parts in Great Britain and at Lebanon indicates that the process produces such fine, sound castings that the usual x-ray examination for flaws in the steel is unnecessary.

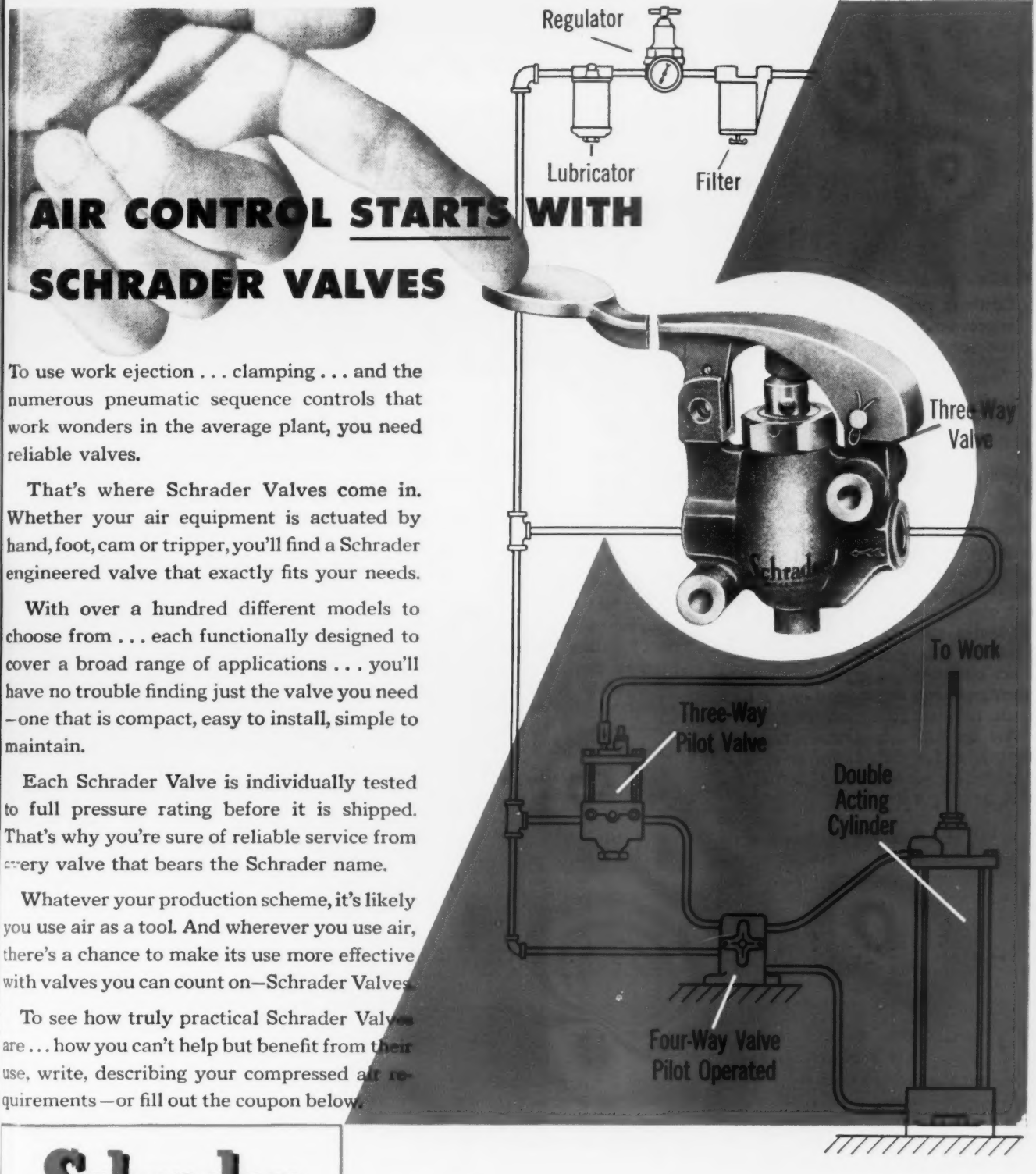
Essentially the "Centri-Die" process involves centrifugal casting into permanent molds. Castings so produced have a dense structure with uniform strength. As the metal mold or die spins on its axis, centrifugal force drives the heavy metal toward the outer surfaces while the lighter products of solidfication are left on inside diameters and are removed later by machining.

Although all metals can be cast by this method, the process is specially suited to highly alloyed metals capable of withstanding heat, corrosion, thermal stress and vibration of jet engine operation. Single castings, cylindrical in shape, and of practically any required diameter, are being produced successfully at Lebanon and subsequently machined into rings by various jet engine manufacturers.

These rings are used in the hottest section of the jet engine from the combustion chambers to the exhaust end. When the jet is operating under normal cruising conditions, the rings reach a temperature of about 1500°F. However, under full power, as may be used in combat conditions, temperatures may go to 1900° F or higher, and the rings must be capable of withstanding the repeated thermal shock of higher temperature at high power and quick cooling as power is reduced.

In addition to its use for producing jet engine parts the process is well suited to the casting of special

(*Concluded on page* 204)



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To use work ejection . . . clamping . . . and the numerous pneumatic sequence controls that work wonders in the average plant, you need reliable valves.

That's where Schrader Valves come in. Whether your air equipment is actuated by hand, foot, cam or tripper, you'll find a Schrader engineered valve that exactly fits your needs.

With over a hundred different models to choose from . . . each functionally designed to cover a broad range of applications . . . you'll have no trouble finding just the valve you need —one that is compact, easy to install, simple to maintain.

Each Schrader Valve is individually tested to full pressure rating before it is shipped. That's why you're sure of reliable service from every valve that bears the Schrader name.

Whatever your production scheme, it's likely you use air as a tool. And wherever you use air, there's a chance to make its use more effective with valves you can count on—Schrader Valves.

To see how truly practical Schrader Valves are . . . how you can't help but benefit from their use, write, describing your compressed air requirements—or fill out the coupon below.

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Division of Scovill Manufacturing Company, Incorporated
465 Vanderbilt Avenue, Brooklyn 38, N. Y., Dept. M-4

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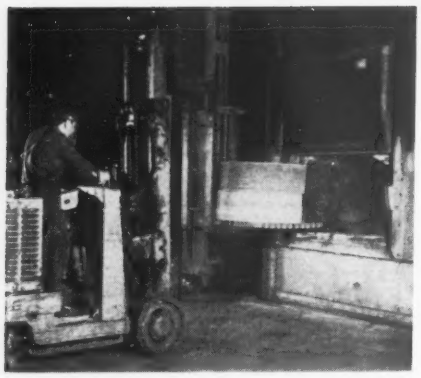


Castings are heat treated for improvement of physical properties and corrosion resistance

(*Concluded from page 202*)

high-alloy steel shapes used in other machinery for industries such as those in the oil, textile and pulp fields where heat and corrosion-resistant parts are needed.

Practice employed at Lebanon Steel Foundry involves use of high-frequency induction furnaces for melting. Alloys added to the steel include nickel, tungsten, chromium, manganese and other metals. Tapped into pouring ladles, the molten metal is transferred to the spinning metal mold. Upon solidification of the casting, the machine flange is removed and a fork truck lifts out the cast ring.

The castings subsequently are heat treated, and a fork truck is used to transfer the rings into and out of the heat treating furnace.

Preliminary machining is done on the rings to remove surface scale before the parts are shipped to the engine manufacturer for final machining.

EDITORS' NOTE: Photos by courtesy of Armstrong Cork Co., Lancaster, Pa. Article abstracted from March, 1953, issue of *Armstrong's Insulator*.

OHIO REGIONAL FOUNDRY MEETING

To Be Held in Cincinnati

SIXTH Ohio Regional Foundry Conference returns to Cincinnati, Sept. 24-25, and will be held at the Netherland Plaza Hotel. Cincinnati District Chapter of AFS is host chapter, with its chairman, William Oberhelman, Oberhelman - Ritter Foundry, Cincinnati, serving as conference chairman. This is the second time the annual Ohio meeting has been held in Cincinnati.

Program has been arranged through the co-operation of the remaining Ohio AFS chapters. The following are serving as conference co-chairmen: Canton: Robert A. Epps, Stoller Chemical Co., Akron; Central Ohio: C. W. Gilchrist, Cooper-Bessemer Corp., Mount Vernon, O.; Northeastern Ohio: S. E. Kelly, Eberhard Mfg. Co., Cleveland; and Toledo: B. J. Beierla, E. W. Bliss Co., Toledo.

All technical sessions will be held at the hotel and the luncheons and conference banquet will be served in the Pavilion Caprice of the hotel. Sessions have been scheduled to conclude early on Friday to facilitate arrangements for those traveling some distance to attend the conference.

Thursday, Sept. 24

9 a.m.—**Registration**

10 a.m.—**General Session:** "Uses of Plastics in the Foundry Industry," by Dr. M. F. Browne, Plaskon Division, Libbey-Owens-Ford Glass Co., Toledo, O. Chairman, B. J. Beierla, E. W. Bliss Co.

12 noon—**Luncheon:** "Tomorrow's Miracles Are Here Today," Stan Farwell, International Business Machines Co.

2 p.m.—**Gray Iron:** "Quality Control in a Gray Iron Foundry," Alexander D. Barczak, Superior Foundry Inc., Cleveland; **Malleable Iron:** "Electric Furnace Annealing," Milton Tilley, National Malleable & Steel Castings Co., Cleveland; **Steel:** "The Selection and Mulling of Foundry Sands," C. E. Wenninger, National Engineering Co., Chicago; **Nonferrous:** "The Selection and Care of Nonferrous Melting Furnaces," Robert H. Campbell, Campbell-Hausfeld Co., Harrison, O.

3:30 p.m.—**Gray Iron:** "A New Era in Melting," Robert H. Zoller, Zoller Casting Co., Bettsville, O.; **Malleable Iron:** "Proper Testing and Evaluation of Grinding Wheels," Harry M. Crowe, General Grinding Wheel Co., Detroit; **Steel:** "Steel Foundry Practice," Frank Kiper, Ohio Steel Foundry Co., Springfield, O.; **Nonferrous:** "Development of a General Purpose Nonferrous Synthetic Sand," William Ball Jr., R. Lavin & Sons Inc., Chicago, and a representative of Jeffrey Mfg. Co., Columbus, O.

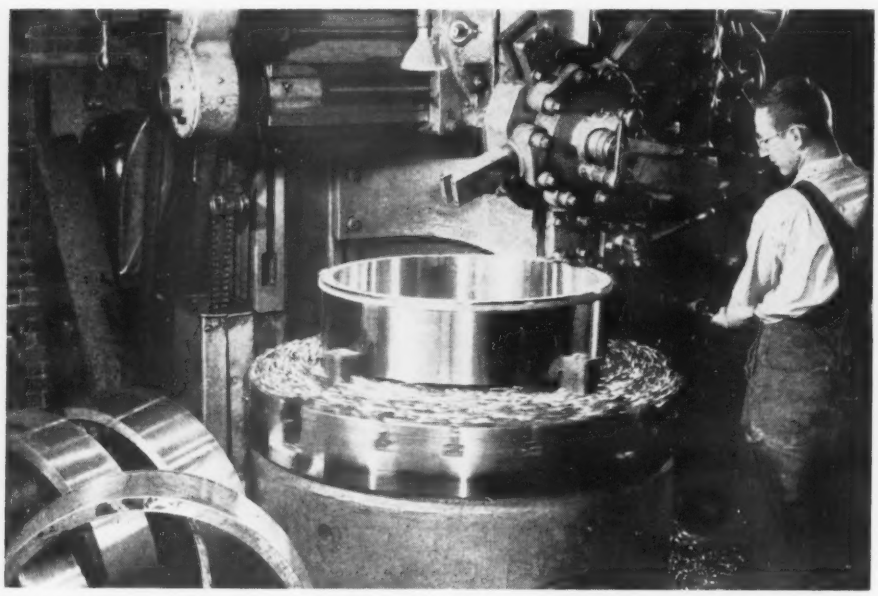
7 p.m.—**Conference banquet.** Speaker, Edward McFaul

Friday, Sept. 25

9 a.m.—**Gray Iron:** "Practical Cupola Control," D. E. Krause, Gray Iron Research Institute, Columbus, O.; **Malleable Iron:** "Duplex Melting Practice and Control," Joseph E. Dvorak, Eberhard Mfg. Co., Division of Eastern Malleable Iron Co., Cleveland; **Steel:** "P-H Value of Sand and Its Relationship to Casting Quality," G. J. Grott, Unitcast Corp., Toledo; **Nonferrous:** "Fluid Flow of Metals," AFS Research Film with Walter Klayer, Aluminum Industries Inc., Cincinnati, as narrator.

10:30 a.m.—**Gray Iron:** "Practical Aspects of Nodular Iron," Thomas E. Eagan, Cooper-Bessemer Co., Grove City, Pa.; **Steel:** "The ADM-Dietert Process of Precision Molding," Warner Bishop, Foundry Products Division, Archer-Daniels-Midland Co., Cleveland; **Nonferrous:** Round table discussion on quality control and scrap reduction by prominent nonferrous foundrymen.

12:30 p.m.—**Luncheon.** Recognition of national AFS officers and speakers.



Finished castings are machined to remove scale and obtain a smooth surface finish. Later the jet engine manufacturer will turn them into engine rings

Metropolitan Brass Group Sponsors Foundry Course

Announcement of a free course in foundry practice to be held at Machine and Metal Evening Trade School, 321 East 96th Street, New York, has been made by the Metropolitan Brass Founders' Association. The course includes green sand molding with various types of patterns including both bench and floor; coremaking, melting, pouring and handling of metal; and cleaning of castings. Practice covers iron, bronze and aluminum and the school's foundry shop is equipped with both gas and electric furnaces.

There will be registration Sept. 14 and 15 and classes will be held Monday and Wednesday evenings from 7 to 9 p.m. There is a short course which will be completed in 25 sessions or 50 hours. The full course will run 50 sessions or approximately 100 hours.

Testing Metal Powders

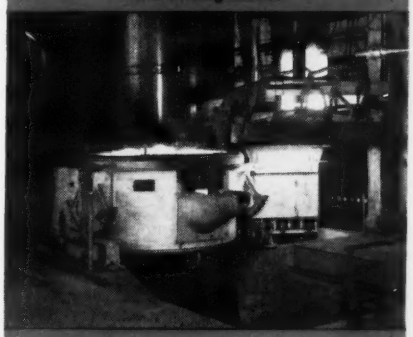
Recently issued publication *Symposium on Testing Metal Powders and Metal Powder Products* is available from American Society for Testing Materials, 1916 Race St., Philadelphia 3, for $2. It contains seven papers and discussions on the subject which were presented at the 1952 annual meeting of the society.

WHITING

Hydro-Arc

ELECTRIC FURNACES

Hydro-Arc furnace with roof lifted and swung aside.



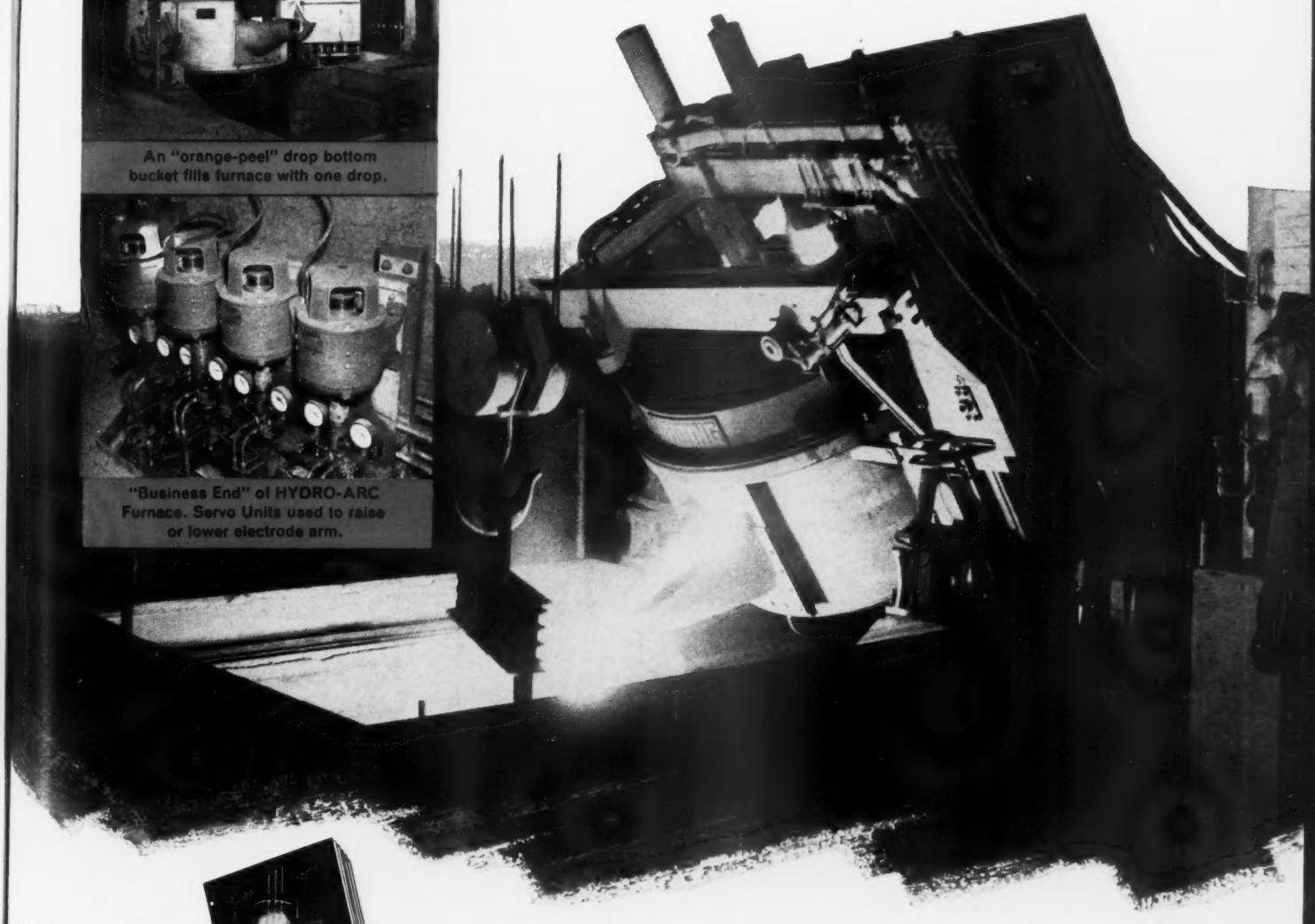
An "orange-peel" drop bottom bucket fills furnace with one drop.

"Business End" of HYDRO-ARC Furnace. Servo Units used to raise or lower electrode arm.

HERE'S THE "Pace-Setter" IN ELECTRIC MELTING!

You ask, "What electric furnace offers the most advantages?" The answer is WHITING HYDRO-ARC because of its important, advanced engineering principles! To name a few:

1. **The Hydro-Arc Automatic Electric Clamp,** pioneered by Whiting, saves up to 90% of furnace down-time for slipping electrodes. It also means an 8% increase in operating time and production . . . and in addition, the elimination of the hazardous electrode slipping operation.
2. **The Unique Hydro-Arc Top Charge,** a load factor improvement, reduces furnace down-time for recharging to only a few minutes. Because of its sound, basic simplicity, limit switches are eliminated and maintenance is held to a minimum.
3. **The Hydro-Arc Air-Counterbalanced Hydraulic Electrode Positioning Equipment** assures less electrical energy and electrode consumption as well as improved metallurgical control and longer refractory life.



Write today . . . for 40 page bulletin FY-168. It completely describes Whiting Hydro-Arc Electric Arc Furnaces!

WHITING CORPORATION

15607 Lathrop Avenue, Harvey, Illinois

Pouring station of the company's recently modernized foundry attracted much attention from guests

Dodge Mfg. Co.

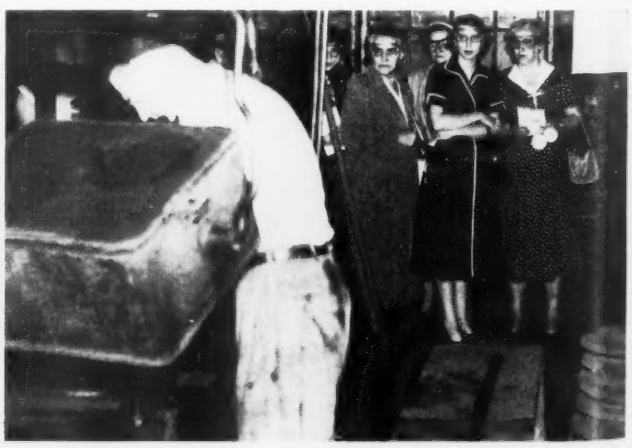
HOLDS OPEN HOUSE

DODGE MFG. CO., Mishawaka, Ind., celebrated its 75th anniversary recently with a plant open house. Over 3200 guests, including families of employees and friends from Mishawaka and South Bend, took guided tours through the plant. A special nursery was provided for small children, and all guests were served refreshments and received souvenirs, including an anniversary brochure.

Another feature of the celebration was a civic testimonial luncheon at which Mayor E. Spencer Walton, presented Joseph E. Otis Jr., president of Dodge, with a bronze plaque on behalf of the city of Mishawaka.

Small children of guests were cared for in a special nursery while their parents visited the plant

After the plant inspection, visitors were served refreshments outside in this colorful courtyard

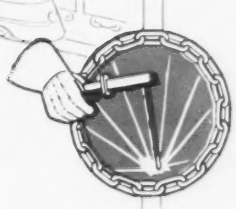


Visitors watching the production of castings used in the manufacture of Dodge transmission machinery

Symbol of Security—

Through the centuries, Chain has come to be a symbol of security and safety. And not without reason! The builders of cities, the producers of goods, the transporters of products—*all* depend on chain to help them do a better job at less cost.

If your operations involve hauling, lifting, towing, bundling or other material handling tasks—look to McKAY CHAIN. There are hundreds of McKAY CHAINS and Assemblies especially designed to do most of these jobs efficiently, easily and economically.



McKAY CHAIN for Every Use

McKAY CHAIN BULLETINS

- McK-Alloy Sling Chains
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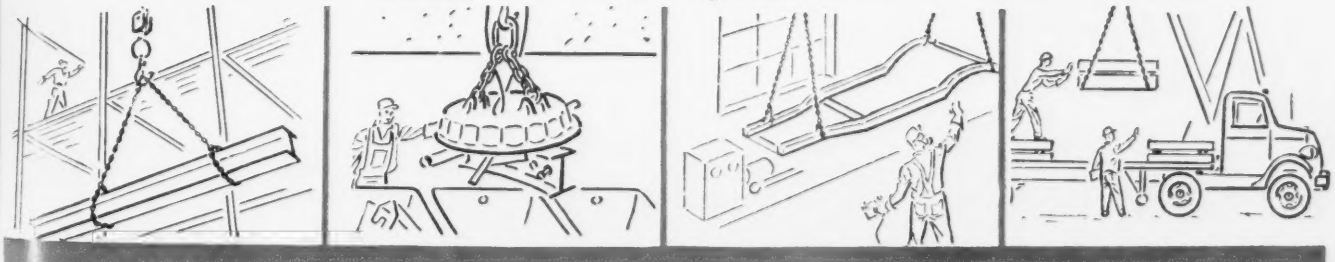
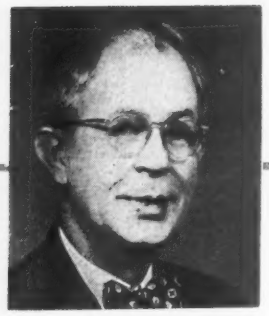
Write for the Bulletins you need.

***McKAY*—A good name for good chain—Since 1881**



The McKAY Company ★ 444 McKay Building ★ Pittsburgh 22, Pennsylvania



Man-to-Man

By RALPH L. LEE

Personality—Personnel—Profit

"The boss' biggest job is to prevent anything and everything from destroying the will of the rank and file to cut loose and do their best"

I HAVEN'T the slightest idea what the mortality rate is among foundry organizations or how that rate would compare with those of other types of business. However, I have a hunch that the difference between foundries that took root in rocky soil during a dry spell and continued to thrive and grow in spite of blights and pests, and the foundries that withered and died in spite of rich soil and irrigation under glass, would be found not in the mechanics of running their business, but in the *humanics*.

What amazes me is how two operators of equally successful foundries frequently stand up in meetings and argue themselves blue in the face about important technical points, in spite of all the research conducted and discussions held on these various phases of foundry practice. On the other hand, from what I've been able to pick up as I wander all over the country from foundry to foundry, there don't seem to be nearly so many inconsistencies and opposite views held among the successful outfits as to the man-to-man relationships required to make a go of things.

In a way this is funny. Here we are, in the habit of picturing the technical or mechanical side of our business as an exact science to be measured right on down to the third decimal point; at the same time, we look upon humanics, or human behavior (the basic factor in everyone's success), as sort of a catch-as-catch-can hodgepodge of guesses, hunches and opinions as to the unpredictable behavior of the two-legged species.

And yet, according to the records in my book of actual business performance, mutually beneficial man-to-man relationships are the one consistent factor. Sherlock Holmes, quoting Winwood Reade to Dr. Watson at 212B Baker St., said, "While the individual is an insoluble puzzle, in the aggregate he becomes a mathematical certainty."

I have a foundryman friend who knows more about every detail of just about every technique involved in the business than almost anyone else I have ever met. I don't believe he ever has been out of work a day in his life, and he's getting along. But it seems that practically every time I run into him or hear of him I find that something has happened to him on a job which showed all the earmarks of turning out to be the climax of his career. For some reason or other he has an unbroken record of missing his boats by narrow margins.

I love this fellow like a brother and have the time of my life whenever we get together to talk foundry. I have one heck of a time, though, keeping him on the track. At every whip-stitch he switches off talking about some interesting molding or melting method onto the subject of some dumb so-and-so who told him he was all cockeyed until he rubbed the fellows nose into the proof that he was right on the beam.

I can hear him now. "'Doc,' I says to him, 'do you know who I am?' and he says, 'Never heard of you.'

"'You haven't?' I says. 'Well believe me, boy, you're goin' to hear plenty of me for quite a spell. I've been sent down here to get you out of the mess you guys have got yourselves into. And I've got the authority too. If you don't believe it, just call up B. D. Go ahead! Call him up!'"

Now that I look back over the long friendship between Dick and me, I don't think he has ever told me of one of his many personal accomplishments without first setting the stage with a bunch of egotistical, envious dumb clucks who not only didn't believe in him, but were all set to see him make an ass of himself.

I realized of course, that Dick was taking some poetic license, maybe unconsciously lifting himself up by lowering the other fellow slightly. In fact, on any number of occasions I happened to know some of these so-called dumb clucks and learned from them that they respected Dick, or at least his experience and judgement.

It became pretty plain that he was convinced that the only way to get ahead in this rugged old foundry game is to carry a big stick and to fight his way to the top against all comers. I feel quite sure that to have all of the answers and never to ask anyone to do anything he couldn't do better was the foundation of his code of conduct among his associates and his helpers.

In fact, the more I think about him and his rather erratic and spotty career, the more obvious it becomes that down in his heart he must have felt that if any job he was given to do or to get done was to be done right, he would have to do it himself, even though it meant hiring hands to carry out his orders (the old master and helper idea).

Fully convinced of being practically without par as far as foundry techniques and failing to recall how much he had learned from others, he hardly could avoid approaching others as though they were lacking and unreliable until they proved themselves otherwise. I'm afraid he unconsciously dared people to do right while expecting the worst. If Dick reads this, I don't think he'll recognize himself. Besides, Dick isn't his name.

I don't know how many foundries are left that were started by master molders and operated by hired hand helpers under orders from the Bull of the Woods, but I suspect they are getting to be rather scarce. I know from personal contact any number that have failed or would have had they not been taken over by more enlightened management.

It has been my hobby and business

(Concluded on page 210)

YOU NEED THE BEST CORE WASH

Buy MEXADIP™

- **MEXADIP WILL NOT FERMENT.** You will not have to dump your wash because of hot humid conditions — no pock marks or pitted coating surfaces with MEXADIP.

- **MEXADIP STAYS IN SUSPENSION.** Let it stand over the week end, it will be ready to go Monday morning.

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IMPROVE CASTING APPEARANCE AND SAVE MAN HOURS IN THE CLEANING ROOM. If you have a problem with core wash, MEXADIP will solve it. Ask us to arrange a test today.

Why wait . . .
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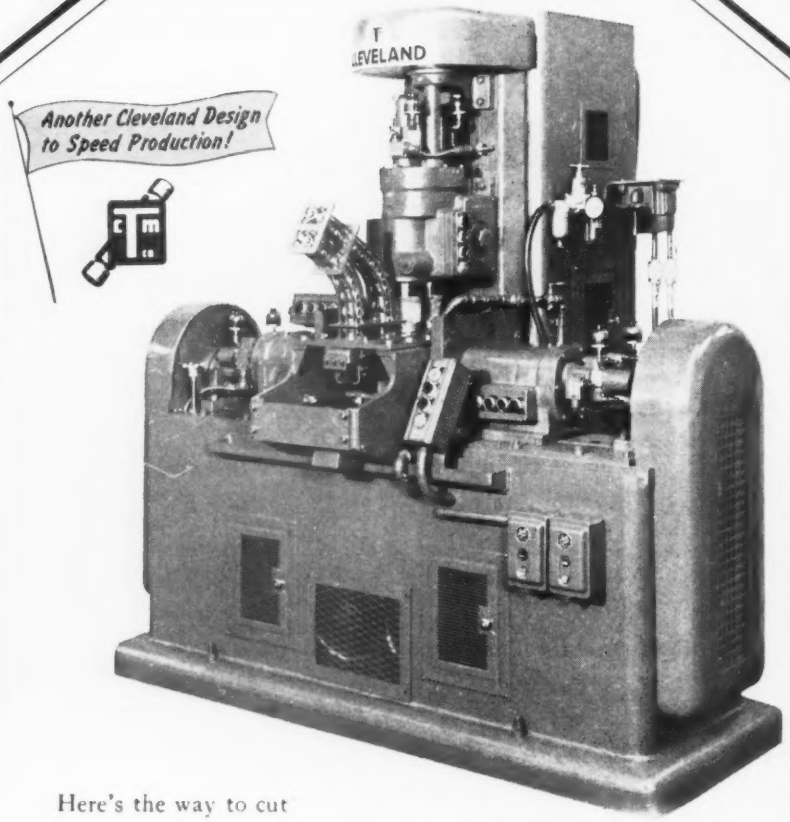
1308 tee fittings per hour!



Here's the way to cut costs on tee fittings! This Model FT-1 will tap 1308 pieces ½" - 14 per hour at 100% efficiency. Also handles ¾" and 1" sizes. All spindles have their own lead screw feed—assuring the precision for which Cleveland Fitting Machines are famous. Produced parts are square and within the required tolerances. Set-up and change-over time is reduced and tap life increased up to 25%. For greater efficiency this Model may be grouped in batteries of three with one operator to each battery.

If you make fittings of any size or type it will pay you to consult Cleveland engineers. Their know-how can save you money.

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THE CLEVELAND TAPPING MACHINE CO.

A Subsidiary of **AUTOMATIC STEEL PRODUCTS, INC.**

CANTON 6, OHIO

For Better Tapping - - Faster!

CLEVELAND *lead screw* **fittings machines**

(*Concluded from page* 208)

for many years to study the ways of many outstanding leaders. I don't think there is one I can recall who has got into the habit of saying, "I never ask anyone to do anything I can't do myself." (Outstanding orchestra leaders surround themselves with virtuosos who can run circles around them.)

I don't believe I can recall one leader in my collection who does not approach his followers expecting the best (the best *they* can do, at least). Neither can I recall one who dotes on solo playing, on inventing or doing anything to show off or to dazzle others.

All are patient up to a reasonable point, but darned good disciplinarians in an impersonal way. Most of my leaders seemed to have learned that, with the will to do, even the least schooled and experienced can outperform the highly trained and educated individual who doesn't give a hoot.

To button up this tirade, my facts force me to the conclusion that the outstanding boss, superintendent, manager or leader who knows what side his bread is buttered on realizes that his personal success can be nothing more or less than a jig-saw-puzzle with each and every piece required to make the whole, for it's in the hands of every person in the gang, from the lowliest shakeout man to the top technician either to make or break.

The biggest job then is to prevent anything and everything from destroying the will of the rank and file to cut loose and do their best. All of their bests added together can come near to pulling rabbits out of hats. With such wide spread will, a foundry could make almost any mistake in the technical book and still come through, although I imagine that such an outfit would be the very one to abide by the rules.

We are leaving an age of mechanics and entering one of humanics, the study of which shows it to be a science in every sense of the word, full of promise and profit.

Conveyor Terminology Manual Is Assembled

Conveyor Equipment Manufacturers Association, One Thomas Circle, Washington 5, has published "Conveyor Terms and Definitions," containing 1500 items agreed upon as standardized terminology by association members. Several illustrations are included and each type of conveyor is defined by what it is rather than by what it does. Principal terms are given in German, French and Spanish also. Copies are $1.

UNIFORM CASTINGS

"from one end of the heat to the other"

EVERY DAY, this New England foundry pours gray iron with a uniformity that insures better machineability of finished castings . . . and operating economies which protect the firm's competitive position. Says an official of this high-production jobbing foundry, "Foxboro Air Weight Control helps us hold our pouring temperature closer than manual control could ever do, and gives us dependable uniformity of castings from one end of the heat to the other".

The Foxboro Air Weight Controller automatically "weighs" air . . . supplies coke charge with exact amount of oxygen for best combustion . . . compensates for atmospheric changes. Faster, uniform melting saves fuel, cuts pigging, adds life to refractories.

Installation is simple . . . on either fan or positive pressure systems. Write for complete details.

Foundry Foreman checks readings on the Foxboro Air Weight Controller (left) and the Wind Box Pressure Recorder (right).

THE FOXBORO COMPANY, 329 NEPONSET AVE., FOXBORO, MASS., U.S.A.

FOXBORO REG. U.S. PAT. OFF. AIR WEIGHT CONTROLLERS

FACTORIES IN THE UNITED STATES, CANADA AND ENGLAND

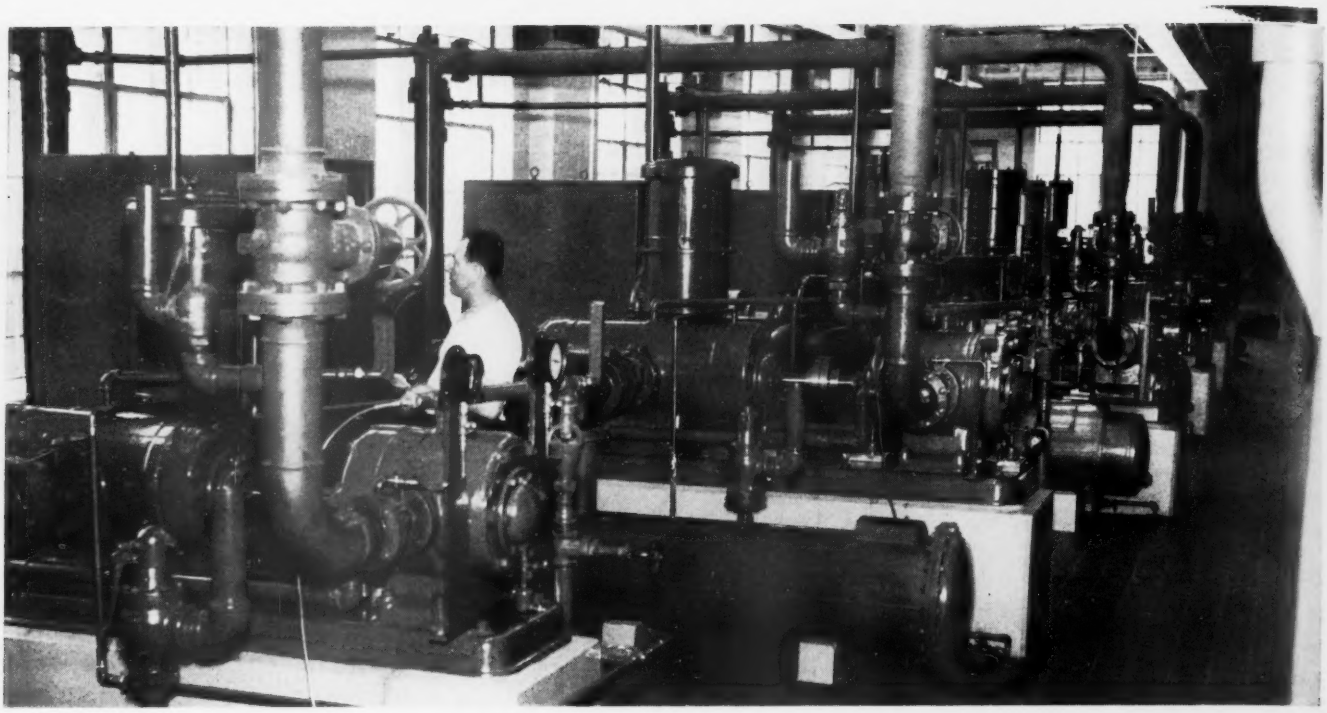


Fig. 1—Six air compressors supply 6800 cfm to plants of Textile Machine Works

COMPRESSED AIR
Finds Wide Foundry Use

LONG one of the foundry's most basic, dependable, and widely used utilities, compressed air today is enabling many foundries to modernize and adopt up-to-date methods to improve production techniques, cut work-hours, and reduce costs.

A case in point is the Textile Machine Works, Reading, Pa. This organization is one of the major units of Wyomissing Industries, the other units being Berkshire Knitting Mills and the Narrow Fabrics Co. Compressed air is produced in one central power station and piped to all these plants, but the bulk of the air is used in the 300,000-sq-ft foundry of Textile Machine Works, manufacturer of a large percentage of the machinery used throughout the braiding and full fashioned hosiery industry.

In recent years Textile Machine Works' foundry has been enlarged and modernized—a process which is still going on—and each step is

(*Continued on page* 215)

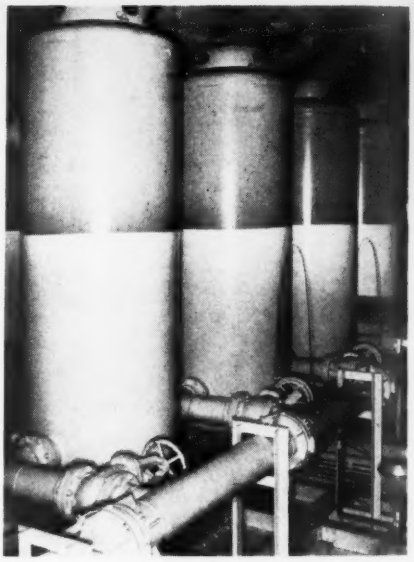
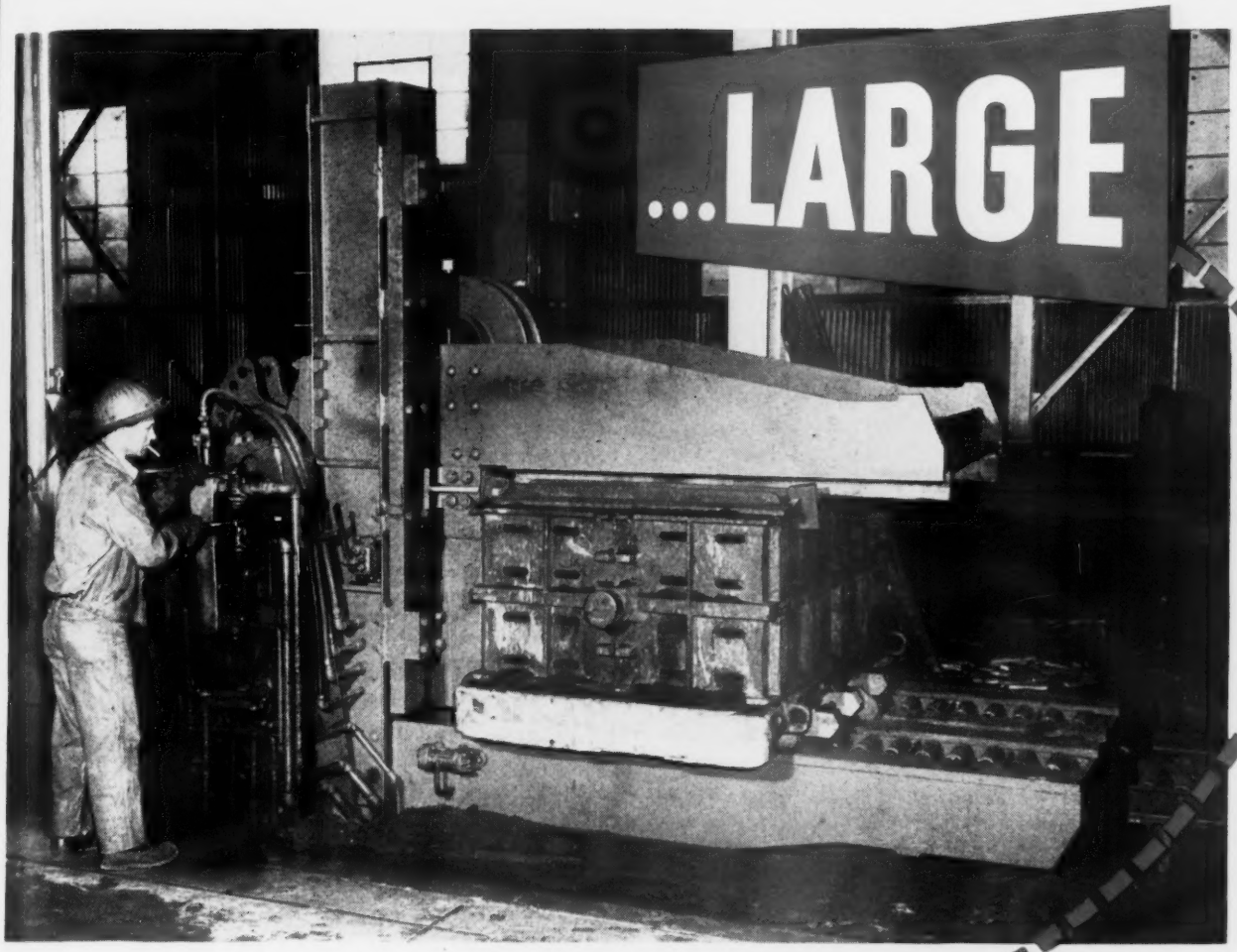


Fig. 2—The compressors discharge air through after-coolers and into these four receivers, 12 ft high, 4 ft. diam.

Fig. 3—Blasting machine, operated continuously, uses 844 cfm

Fig. 4—Molding requires air for power



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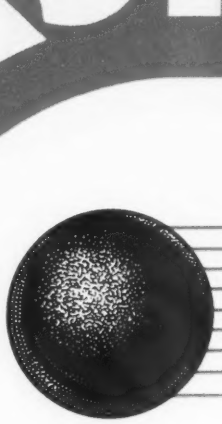
INTERNATIONAL MOLDING MACHINE COMPANY

LA GRANGE PARK, ILLINOIS

The International Line is designed by experienced foundry engineers who have a practical working knowledge of the problems of the industry.

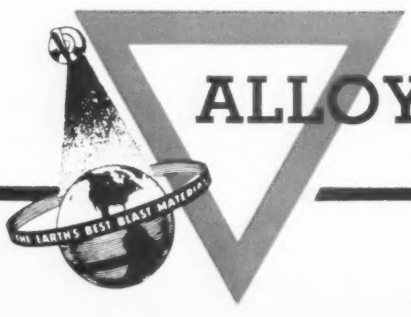
"There is an INTERNATIONAL for Every Type of Job"

AMASTEEL



Genuine alloy steel shot

The greatest development in metal abrasives
Will last five times longer than regular shot
Produces a more attractive finish
Reduces maintenance expenses
Requires less storage space
Cuts down length of work cycle
Saves as much as half your shot cost
Produces less dust
Out-performs all shot and grit on every point



ALLOY METAL ABRASIVE CO.

311 W. HURON ST., ANN ARBOR, MICH.

Representatives in most principal cities

(*Continued from page* 212)

marked by additional compressed air capacity. Fig. 1 shows the air compressors, the first of which was installed in 1943 and the sixth of which has just gone in. These compressors were manufactured by the Fuller Co., Catasauqua, Pa. The installation comprises one 100-hp unit, one 150-hp unit and four 250-hp two-stage rotary units. Its total capacity is approximately 6800 cfm at 125-lb gage discharge pressure.

Air enters the first stage through a filter and is compressed to approximately 31 lb. After leaving the first stage, the air passes through an intercooler where it is brought from about 250°F to about 90°F. Ambient temperatures will cause slight variations in these temperatures. By cooling the air at this point its volume is reduced prior to entering the second stage. From the intercooler, the air passes to the second stage from which it is discharged at 125-lb pressure. Aftercoolers cool the high-stage discharge from about 290°F to within 10 degrees of the cooling water, principally to condense moisture and oil vapor which is subsequently trapped off.

Cooling water flows in series first to the aftercooler, then to the intercooler, then to the first stage and then to the second stage. A regulator controls the volume of water passing through the system so that it leaves at a temperature not higher than 110°F . The actual volume depends upon cooling requirements—ie, intake air temperature, intake water temperature, and the load on the compressor.

Air from the compressors, after passing through the after-coolers, passes into the receivers shown in Fig. 2. Output of the compressors is automatically maintained with the unloaders set to cut out at 125 lb. As soon as this value is reached the regulator of one of the compressors "unloads" that unit. If, with one compressor out, not enough plant equipment is being used to drop the system pressure, additional compressors will cut out in sequence.

The bulk of the processed air is used in foundry operations. For ex-

(*Concluded on page* 218)

Meetings of Interest to Foundrymen

Sept. 16-17—American Die Casting Institute, annual meeting, Edgewater Beach Hotel, Chicago

Sept. 17-18 — National Foundry Association, annual meeting, Plaza Hotel, New York

Sept. 17-18—Niagara Frontier Regional Foundry Conference, sponsored by Western New York, Ontario, Northwestern Pennsylvania, Rochester, Central New York and Eastern New York Chapters of the AFS, Hotel Statler, Buffalo

Sept. 19-26 — International Committee of Foundry Technical Associations, annual foundry congress, Paris, France

Sept. 21-22—Steel Founders' Society of America, fall meeting, Homestead, Hot Springs, Va.

Sept. 21-25—Instrument Society of America, national congress and exhibit, Sherman Hotel, Chicago

Sept. 24-25 — Ohio Regional Foundry Conference, sponsored by University of Cincinnati and Ohio AFS Chapters, Netherlands-Plaza Hotel, Cincinnati

Sept. 25—Malleable Founders' Society, general society meeting, Hotel Cleveland

Oct. 8-9—Gray Iron Founders' Society, annual meeting, New Hotel Jefferson, St. Louis

Oct. 8-9—Michigan Regional Foundry Conference, Kellogg Center, Michigan State College, East Lansing, Mich.

Oct. 15-17—Foundry Equipment Manufacturers' Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 16-17—Northwest Regional Foundry Conference, sponsored by Oregon, Washington and British Columbia Chapters, AFS, New Washington Hotel, Seattle

Oct. 17-20—Conveyor Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 19-23—National Safety Council, national safety congress and exposition, Chicago

Oct. 19-23—American Society for Metals, national metal congress and exposition, Public Auditorium, Cleveland

Oct. 29-30—Metal Castings Conference, sponsored by Purdue University, Michigan and Central Indiana AFS chapters, Purdue University, West Lafayette, Ind.

Nov. 4-6—Steel Founders' Society of America, T & O Conference, Carter Hotel, Cleveland

Nov. 4-6—Industrial Management Society, annual time and motion study and management clinic, Sheraton Hotel, Chicago

Nov. 5-6—Annual Pittsburgh Diffraction Conference, Mellon Institute, Pittsburgh

Dec. 3-5—American Institute of Mining & Metallurgical Engineers, electric furnace steel conference, Netherland-Plaza Hotel, Cincinnati

1954

Jan. 22—Malleable Founders' Society, general society meeting, Hotel Cleveland, Cleveland

Jan. 25-28—Plant Maintenance & Engineering Show, International Amphitheater, Chicago. The **Plant Maintenance & Engineering Conference** will be held concurrently at the Hotel Conrad Hilton, Chicago

Feb. 1-5—American Society for Testing Materials, committee week, Hotel Shoreham, Washington, D. C.

Feb. 11-12—Wisconsin Regional Foundry Conference, Schroeder Hotel, Milwaukee

Feb. 18-19—Southeastern Regional Foundry Conference, Patten Hotel, Chattanooga, Tenn.

Mar. 15-19—National Association of Corrosion Engineers, tenth annual conference and exhibition, Kansas City

Mar. 16-17—Steel Founders' Society of America, annual meeting, Edgewater Beach Hotel, Chicago

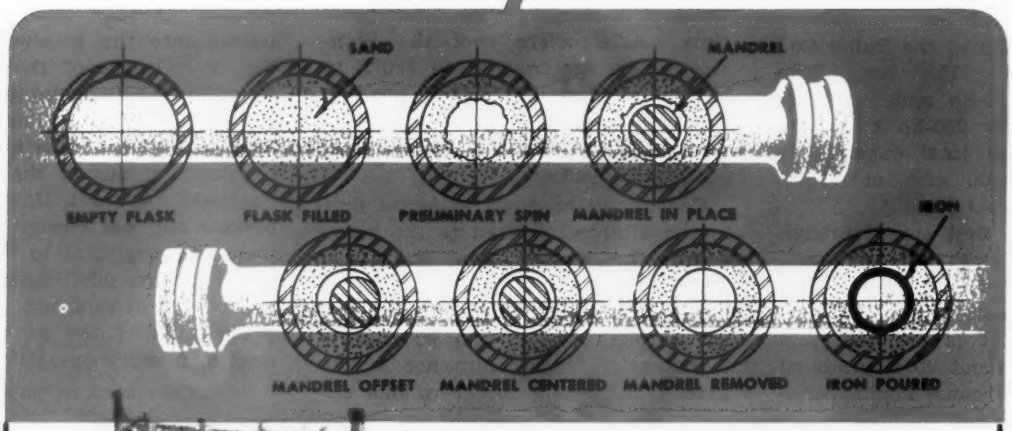
Apr. 5-7—American Institute of Mining & Metallurgical Engineers, national open hearth conference, Palmer House, Chicago

Apr. 8-9—Malleable Founders' Society, market development conference, Pittsburgh

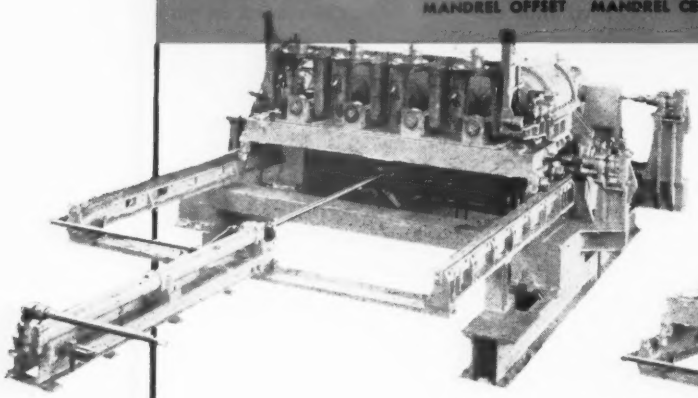
May 8-14—American Foundrymen's Society, annual convention and exhibition, Public Auditorium, Cleveland

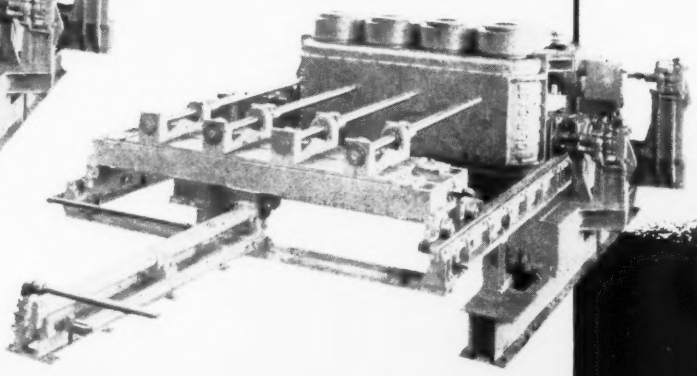
June 14-15—Malleable Founders' Society, annual meeting, Seigniory Club, Province of Quebec, Canada

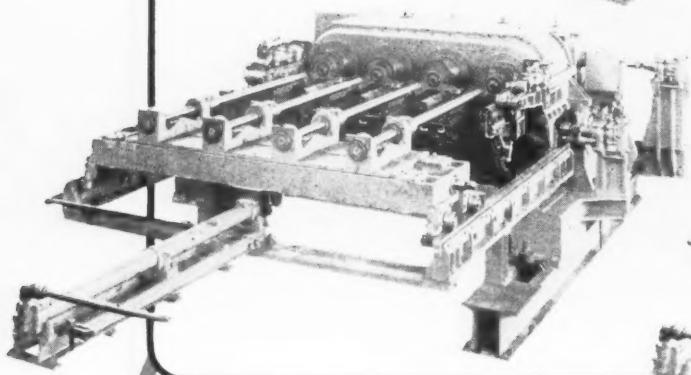
June 14-18—American Society for Testing Materials, annual meeting, Hotels Sherman and Morrison, Chicago

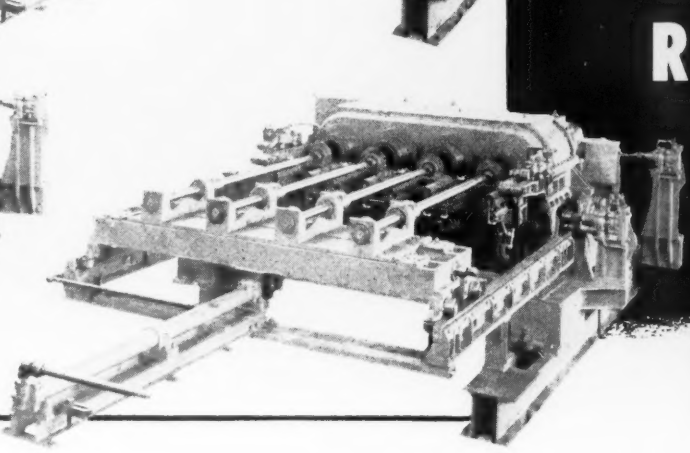


Cross-sectional views of one flask during complete cycle.









HERMAN MOLDING MACHINES MA

NO. 9 OF A SERIES

The Herman Rol-O-Cast machine illustrated here is a revolutionary development in centrifugal casting. Evidence of this is perhaps best provided by current production achievements in the plant of a large soil pipe producer.

Every hour in this plant on a maintained production basis, 136 lengths of 4" diameter, cast-iron soil pipe 5' long are turned out on the Rol-O-Cast machine.

An ingenious electronic control system is the key to this HERMAN development . . . it automatically directs 25 timed sequences in each complete cycle of operation. Manual effort is reduced to a minimum—one man supervises the controls and sets the hub cores, two men pour and two men remove the pipe.

The simple sketch at the top of the left-hand page gives a quick explanation of what the process involves.

We will be glad to provide more information on the economies, efficiency, adaptability and flexibility of the Herman Rol-O-Cast machine.

R(·O-Cast.....the HERMAN
Centrifugal Casting Machine

There is a type and size Herman Molding Machine for all foundry operations.

MA HEIR WAY BY THE WAY THEY'RE MADE

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

Herman MOLDING MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

Simplified PIG CASTING

- Stationary wheel design eliminates 80% of moving parts
- For ferrous and non-ferrous smelters and foundries

Bailey ENGINEERS

PIG CASTING MACHINE

Cold pigs as delivered from the machine.

Here is the means to increased pig casting capacity—at a considerable reduction in maintenance and operation costs. Basis of this machine's performance and service are the stationary flanged wheels over which the endless chain of moulds runs.

(*Concluded from page 215*)

ample, blast cleaning operations as illustrated in Fig. 3 require a constant supply of air. The machine shown is but one of five similar units. Work is placed on the circular table which rotates it through a stream of air-propelled abrasives. Finished work comes out on the other side of the machine and is removed for machining or assembly. This machine has four ⅜-in. nozzles, each requiring 211 cu ft of air per min, or 844 cfm for the complete machine. This, plus the requirements of the other machines, calls for nearly 2000 cfm for blast cleaning alone.

Much of the molding equipment is air operated. As shown in Fig. 4, gates of overhead sand hoppers are air operated. The molder merely pushes a foot-operated valve and a compressed-air cylinder raises the hopper gate to supply sand until the machine operator closes the gate. At the same station (one of 27) air is the power source for operation of the jolt-squeeze machine and in vibrating the pattern for drawing. The molder's station also is equipped with a general purpose air hose for cleaning.

Other compressed air uses in the foundry include operation of core blowers, pin-lift machines on which flasks are rammed by a sandslinger, and rams that push aluminum pallets (stacked after shakeout) from one conveyor to another.

Handbook Tells How To Set Up Safety Program

A convenient safety guide for the manager of a small business or the supervisor of a department in a large organization, the National Safety Council's new "Handbook of Accident Prevention for Business and Industry" shows how to set up and maintain a safety program. Detailed information is included on such subjects as plant layouts, materials handling, housekeeping, machine guarding, electrical hazards, pressure vessel hazards, first aid, fire prevention and personal protective equipment.

The 94-page handbook advises small business men who cannot afford to employ a full-time safety specialist to make use of outside assistance afforded by service and insurance organizations, governmental agencies, trade associations and professional associations. It is profusely illustrated and contains several check lists. Further information and prices are available from the National Safety Council, 425 North Michigan Ave., Chicago 11.

FOR SAND RECLAMATION you need HYDRO-BLAST

FIX THESE 6 VITAL FACTS IN YOUR MIND

1. **Richest savings possible for iron and steel foundries are in the lush field of Sand Reclamation.**

2. **Nearly all the leading foundries in the U. S. chose the Hydro-Blast method of sand reclamation as most effective and by far the most economical.**

3. **91 per cent of all used sand reclaimed in U. S. and Canadian iron and steel foundries is reclaimed by Hydro-Blast.**

4. **90 per cent of your refuse sand *can be made equal or superior in quality to parent new sand* by Hydro-Blast.**

5. **You can count on full amortization of your Hydro-Blast sand reclamation unit *within two years*—as a result of reduced sand costs, lower transportation costs, increased production, and better quality of castings.**

6. **Only Hydro-Blast provides a complete engineering and technical service—that starts with a plant custom-designed to your needs and follows through installation to make certain of efficient operation and proper sand use.**

* To make your own preliminary estimate of *how much you can save per year with Hydro-Blast*, we have a simple, handy form that you'll find exceedingly helpful. Glad to send it when requested on your firm letterhead.

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CHICAGO 47, ILLINOIS

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a BETTER Cupola Gun and a BETTER Cupoline

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Thanks to our advancing methods, a new *Cupoline* now brings you a still more effective composition and greater uniformity. Results: increased flowability, minimum rebound and negligible burn-out.

Bondactor as redesigned has: (1) a new, exclusive air recovery system to reduce air consumption per pound of refractory, (2) a larger, more powerful air motor, (3) an improved rate of flow control, (4) a heavier, more positive material valve assembly, and (5) minimum maintenance.

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the equipment AND *the refractory*
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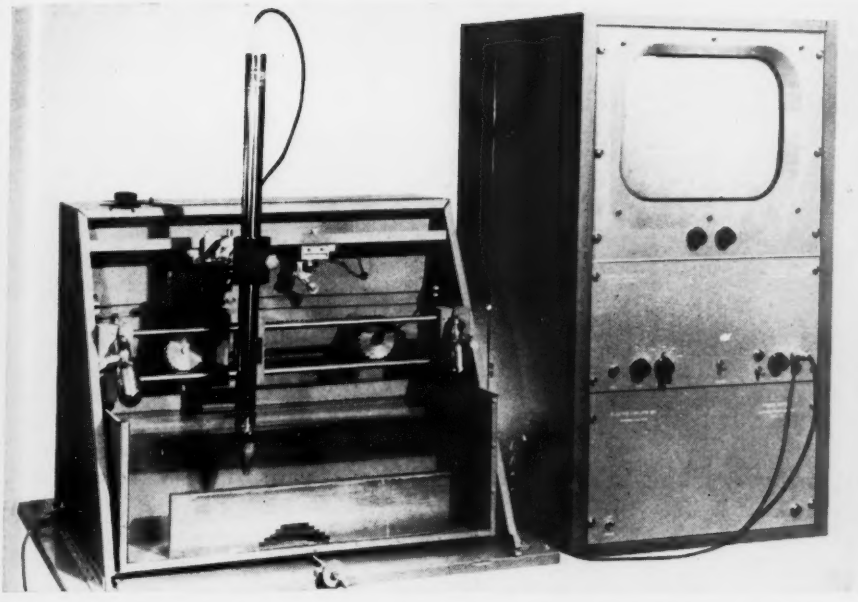


Special arrangement to demonstrate use of immersion scanning. Test specimen in tank at left was prepared to have artificial defects visible from the side. Note the flaw pattern reproduced on cathode screen, upper right

Original ultrasonic reflectoscopes required products to be manually scanned as shown here

ULTRASONIC TESTING OF CASTINGS

By THOMAS A. DICKINSON

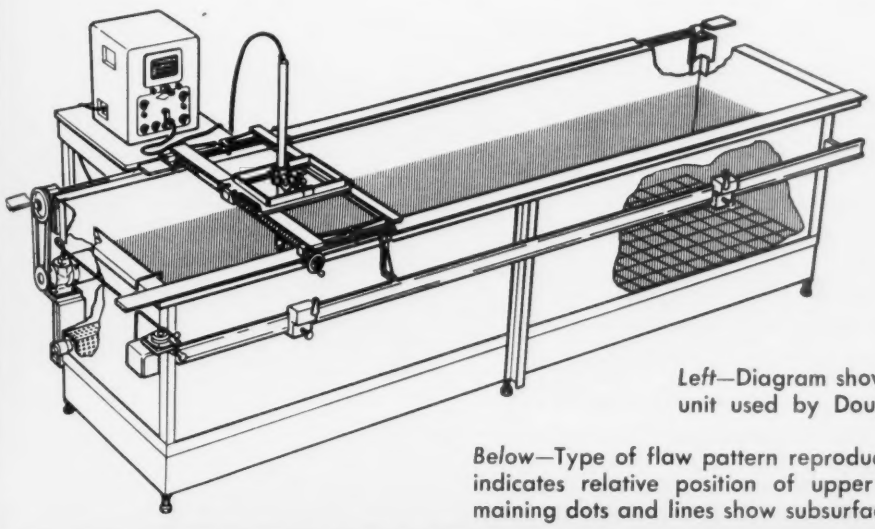
THERE is a general belief among foundrymen that porosity obviates the possibility of using ultrasonic inspection equipment for the nondestructive testing of castings.

This belief is justified insofar as extremely porous sand castings are concerned, because ultrasounds apparently cannot be used to distinguish very large pores from the sort of defects whose presence or absence determines the acceptability of cast-metal articles. However, porosity has not been the feature that has precluded the ultrasonic testing of many foundry products. Many castings could not heretofore be ultrasonically tested because their design characteristics caused them to be inaccessible to the output of available inspection equipment.

Recent development of an "Immersion" testing technique at Electro-Circuits Inc., Pasadena, Calif., permits ultrasound to be used to determine the presence or absence of internal flaws in all but the most porous types of castings.

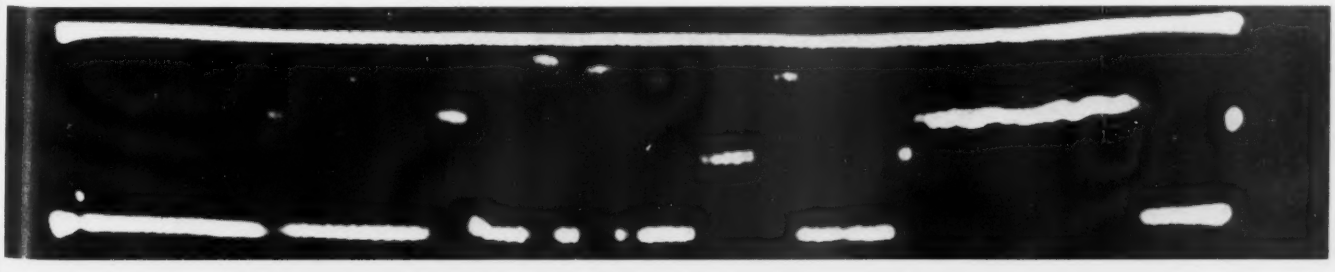
In principle, the new technique cannot be distinguished from older ultrasonic inspection methods because it involves the use of resonance phenomena which make it possible to:

1. Generate a high-frequency vibration or "inaudible sound" with the resonance value of a given inspection medium by using oscillating current



Left—Diagram showing details of large immersion-scanning unit used by Douglas Aircraft Co. for ultrasonic testing

Below—Type of flaw pattern reproduced on cathode screen. Top long line indicates relative position of upper surface of inspection medium. Remaining dots and lines show subsurface points where echoes were produced



"Electro" field men are fully capable of specifying or assisting in specifying all types of grinding wheels. They are competent to run tests. And they can take full charge of all phases of any customer's grinding wheel requirements and problems.

Here is a broad, job-side service with a definite objective . . . that of delivering to you specific-purpose grinding wheels.

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GRINDING WHEELS
resin — vitrified

K-439

to expand and contract a piezoelectric crystal.

2. Propagate a sonic impulse, thus generated, through the inspection medium until the impulse comes in contact with a non-resonant material —such as a gas pocket within a casting or a tabletop supporting the casting.

3. Detect and amplify "echoes" produced when ultrasounds contact non-resonant media.

4. Convert the amplified echoes into visual signals which can be projected onto the face of a cathode tube, calibration of which is such that echoes produced by flaws can be quickly and accurately distinguished.

However, with the well-known ultrasonic reflectoscope, all this was accomplished by "contact scanning"—that is, by manually holding a crystal transmitter-receiver unit in close contact with one surface of an inspection medium. Close contact was essential because ultrasounds of the types used in testing materials have frequencies ranging upward from about 1,000,000 cycles per second, and consequently cannot be effectively propagated through the thinnest layer of air—although they will penetrate most liquids and solids.

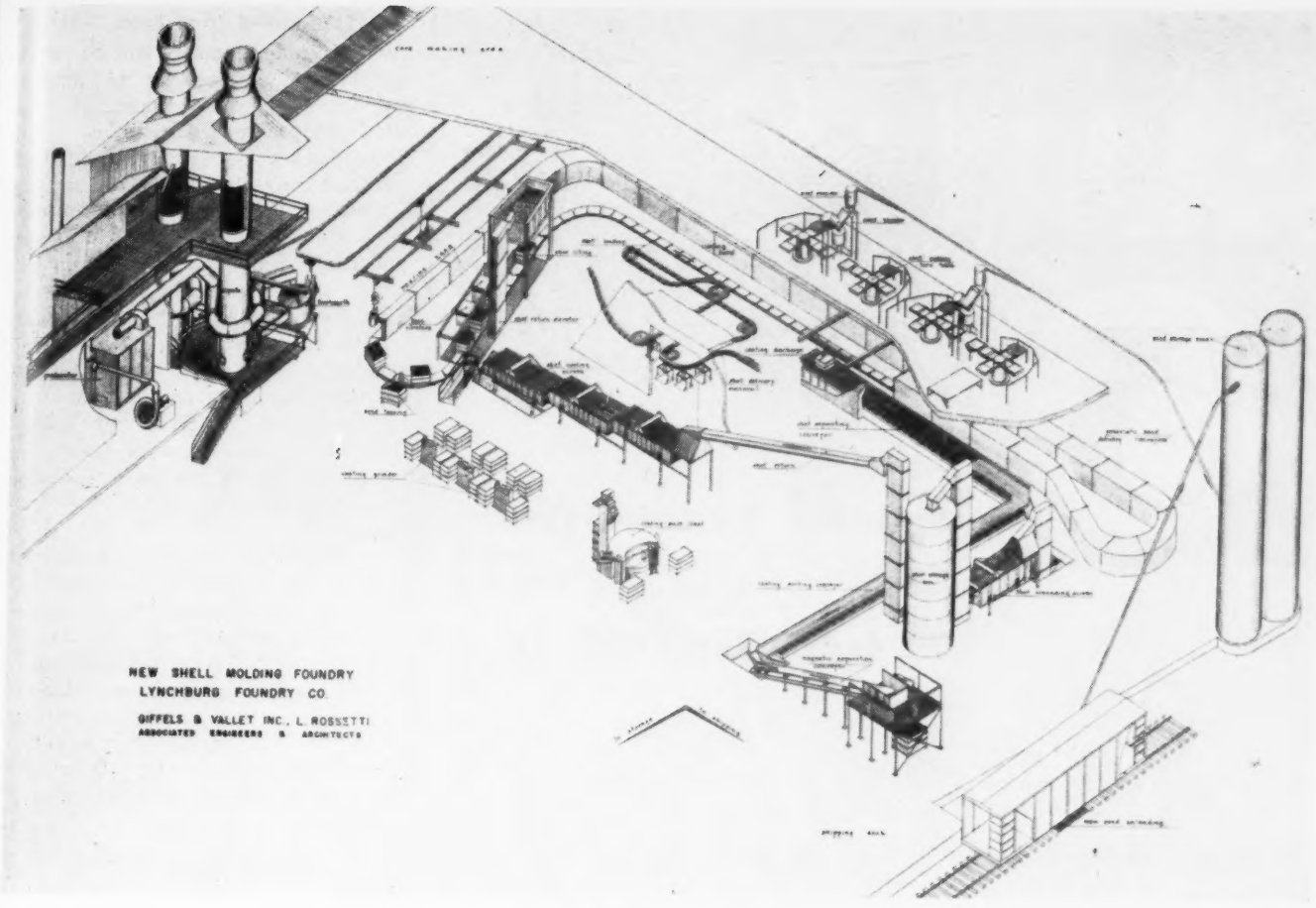
Location Was Difficult

Contact scanning was, and still is, an effective technique for the inspection of materials with relatively smooth and flat surfaces. But, as this was originally accomplished with the reflectoscope, it was difficult to ascertain the size and location of many internal flaws because each produced a visual signal with approximately the same size and location on the face of a cathode tube.

Where the immersed-scanning technique is employed, products with highly irregular configurations and uneven surfaces can be effectively tested because both the inspection medium and the vibrating piezoelectric crystal are submerged in a fluid (usually water, although other liquids such as mercury and oil have served the same purpose). The fluid, of course, serves as a conductor for ultrasonic impulses.

Considerable energy is echoed when an ultrasound, traveling through a fluid, first contacts the inspection medium. However, such echoes are useful to the extent that they produce reference marks which indicate the relative location of the upper surface of the inspection medium on the face of a cathode tube; and, if the frequencies of the ultrasonic impulses are in reasonable conformity with the resonance properties of a

(*Continued on page* 224)



EVALUATION OF VARIOUS MOLDING METHODS

resulted in the selection of shell molding for specific types of castings for Lynchburg Foundry.

The shell molding foundry becomes an important adjunct to their sand foundry for greater variety of production to meet their customer demands.

SEE WHAT *They* SAY ABOUT

Giffels & Vallet

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GIFFELS & VALLET, INC.

INDUSTRIAL ENGINEERING DIVISION

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5

good reasons why you profit from using a Sandcutter

. . . for fast, low-cost sand conditioning

1. Mixes Sand More Thoroughly—The Sandcutter cuts through every foot of sand at least 100 times. Its whirling blades completely distribute bond and moisture to give the sand the right texture for a perfect mold.

2. Conserves Manpower—The Sandcutter, using only one operator, will cut a heap 30′ long by 60″ wide in less than two minutes.

3. Increases Molder Output—Molders put up more molds per day because sand is in excellent condition for molding, prepared in accordance with individual requirements for moisture, bond and permeability.

4. Reduces Rejects—Because sand is thoroughly tempered, common molding faults such as drops, scabs and run-outs are largely overcome. Uniformity of sand makes uniform castings.

5. Improved Casting Appearance—The soft, fluffy, well-conditioned molding sand imparts a finer finish to the castings.

BULLETIN No. 25 explains why the Sandcutter will do a better job of sand conditioning for you. Write today for your copy.

SAND CONDITIONING HEADQUARTERS FOR 46 YEARS

American
WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka 2, Ind.

SANDCUTTER®

(*Continued from page* 222)

casting, enough energy will be propagated into the casting to produce "secondary" echoes—which will denote the presence or absence of internal flaws, once they are amplified and converted into visual signals.

Because there is no need for contract between a piezoelectric crystal and the surface of an inspection material, an immersion-scanning crystal may be manually or mechanically moved back and forth over the surfaces of an inspection material—transmitting and receiving hundreds of inspection impulses per second. This is analogous to the scanning operation which makes it possible to transmit and receive television signals.

Consequently, if immersion-scanned echoes are amplified and projected onto the screen of a cathode tube, it becomes possible to observe the size of each internal flaw and the location of the flaw with reference to the upper surface of the inspection medium. This, in turn, makes it possible to distinguish insignificant flaws from the sort of internal defects that merit rejections.

Glow for Many Seconds

Visual signals produced with immersion-scanning equipment are impinged on the face of a cathode tube with a special phosphor screen, so that each will glow for many seconds. Thus, many signals representing a multitude of details in the cross-section of a casting can be simultaneously observed and (if necessary) recorded with photographic equipment.

For production purposes, it is generally desirable to have a special tank for the immersion solution. However, since the size of the tank depends on the dimensions of the articles that must be tested, this cannot be regarded as a practical limitation.

Where the construction and use of tanks has been impractical, as in the inspection of underground pipelines, special immersion fixtures have been devised. The general purpose of such fixtures was to keep a steady stream of water flowing over the piezoelectric crystal and the inspection area against which its output was directed at any given instant.

The crystal is usually installed in a tubular housing or "search unit," which in turn may be supported by any of numerous mechanically or manually operated fixtures for the scanning of various products.

Standard crystal output frequencies for the immersion scanning of castings currently range from 5 to 25

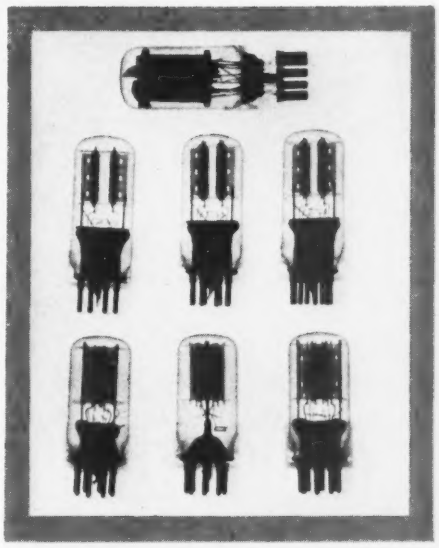
(*Concluded on page* 226)

one minute
is all it takes to get finished, dry radiographs

Subject: **IGNITION CABLE ELBOW** (Ignition cable elbows filled with insulating sealing compound.)
Objective: To confirm winding spacing alignment of center wire.
Disclosed: Gas bubbles in elbows where compound failed to fill.

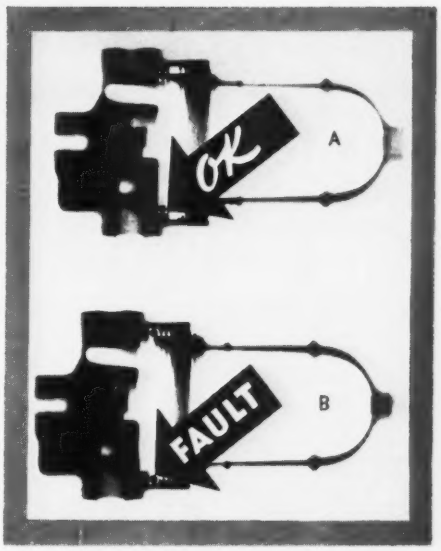
* NOTE: Reduction to 1/5 size, combined with image decay incident to the printing process, seriously degrades in these miniature reproductions the fine detail of the 10" x 10" originals.

like



Subject: **ELECTRONIC TUBES**
Objective: To confirm alignment and spacing of elements.
Disclosed: All elements correctly oriented.

these*



Subject: **CAST ALUMINUM GASOLINE FILTER**
Objective: To confirm correct placement of gasket after completion of assembly.
Disclosed: (A) Correct assembly (B) Fractured gasket slipped out of place.

with PICKER-POLAROID

the "rightaway" radiograph

Make the exposure and get the finished, dry radiograph a minute later . . . right where you are, in *broad daylight,* if need be. Because the Polaroid x-ray packet processes itself, you don't need a darkroom, or tanks of solutions, or dryers, or even an illuminator to view it. All you need is your source of x-rays, a supply of packets, and the compact processor unit which automatically delivers the finished radiograph.

Maybe there's a place for this quick x-ray inspection method somewhere in your operation. Ask your local Picker office to help you explore your problem, or write

PICKER X-RAY CORPORATION
25 SOUTH BROADWAY, WHITE PLAINS, N. Y.

Picker x-ray POLAROID

HAUSFELD
FURNACES

FOR "ALL-OUT" PRODUCTION
IN NON-FERROUS FOUNDRIES

Provide the
Utmost in Speed
Production
and Safety

FURNACES FOR
BRASS • ALUMINUM • MAGNESIUM
AND ALL OTHER
NON-FERROUS ALLOYS

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

(Concluded from page 224)

megacycles. These are somewhat higher than the frequencies used in the operation of other types of ultrasonic inspection instruments, and they are advantageous to the extent that they permit the detection of flaws such as inclusions which could not previously be located.

Such frequencies were not employed in the operation of older types of ultrasonic inspection equipment because they necessitate the use of extremely-thin piezoelectric crystals, which can be easily scratched or damaged when they come in contact with other materials.

As a rule, the fixtures supporting an immersion search unit are adjustable so that the output beam of their crystals can be directed at a workpiece from a number of different angles. This is an advantage because flaws in different materials will produce echoes with varying magnitudes in accordance with the attitude from which they are scanned.

For example, a crack in a casting may appear to have pinpoint dimensions if it is scanned from one end; but, if it is scanned from the side, it may turn out to be a flaw extending several inches through the metal.

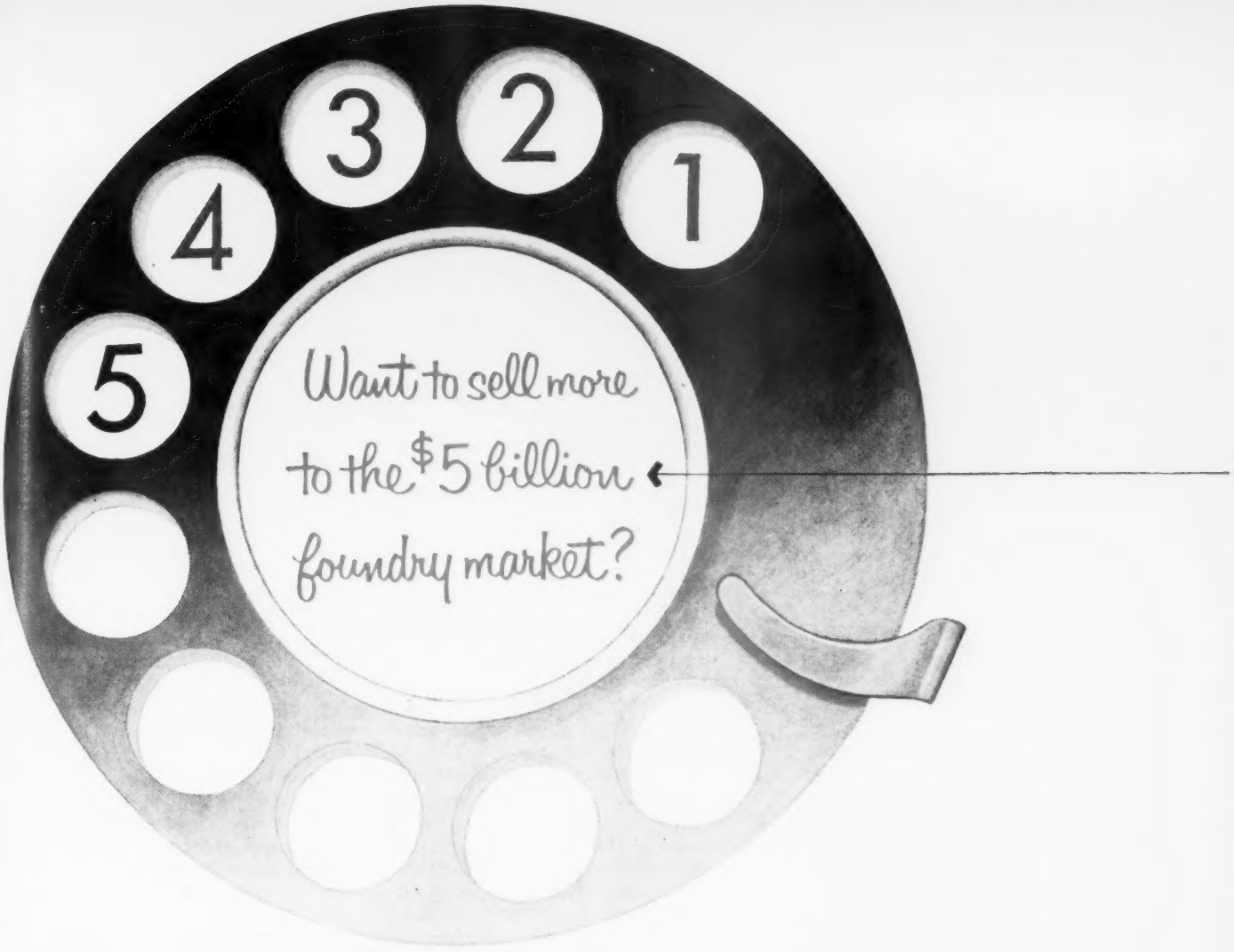
The cost of constructing and operating immersion-scanning equipment is approximately equivalent to the cost of standard X-ray facilities.

Ultrasonics, like gamma radiations and all other forms of energy, can be dangerous in certain circumstances. However, no special safety measures are essential to the use of ultrasonic test equipment because the energy generated by such equipment is of low intensity and, as previously noted, incapable of penetrating the thinnest layer of ordinary air.

Booklet Covers Foundry Research Activities

Emphasizing the importance of trained personnel and specialized equipment, a booklet published by the Armour Research Foundation of the Illinois Institute of Technology, Chicago, describes the facilities and activities of the foundation's foundry and steelmaking section.

A partial list of the section's research activities includes work on steel casting studies relative to fluid flow, gating and hot tearing; inoculation studies in gray iron and steel; development of foundry molding techniques and sand; evaluation and development of resin binders, cereal binders and bonding clays; development and application of shell molding, and other projects.



call on **Foundry's**

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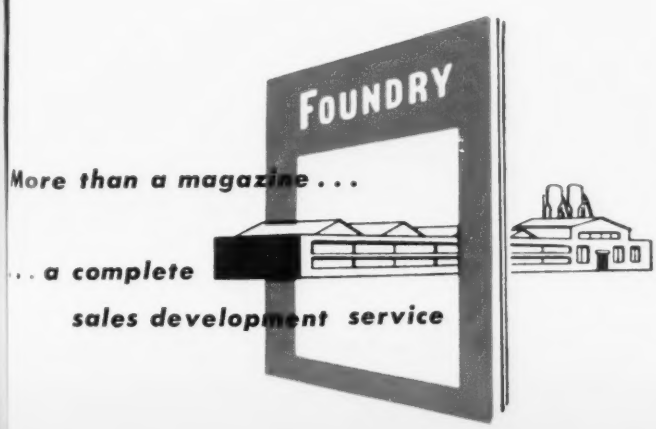
to put extra push behind your sales program

What is PLUS 5? It's your key to more business from foundries. It gives every FOUNDRY advertiser a bonus he can get from no other source. Here is help in analyzing this market—studying sales territories and potentials—planning the sales effort—and creating a constructive promotion program to the 5 billion dollar foundry market. It's time to take a new look at this market—and at the unusual selling aids we have for you. Say PLUS 5 to your FOUNDRY representative and he'll show you this 5-step program designed to move more of your products into foundries.

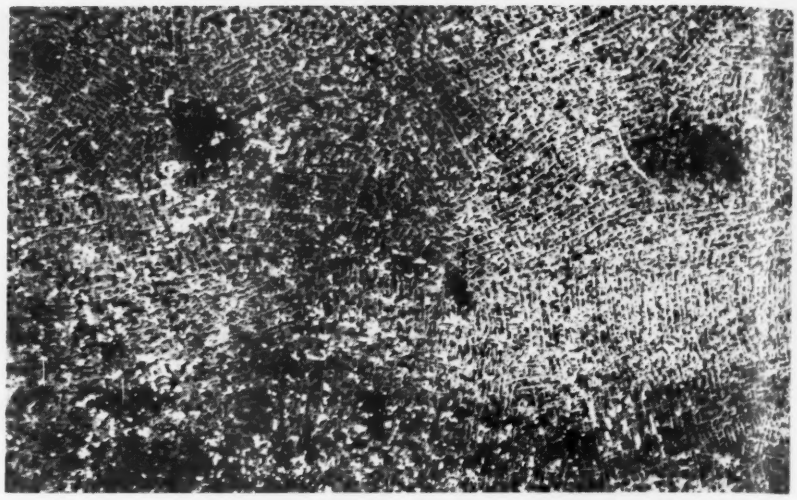


FOUNDRY • Penton Bldg. • Cleveland 13, Ohio

Copper Oxides

• • Useful Tools in Casting Copper-Base Alloys

By L. G. KLINKER
Chief Engineer, The Glidden Co.
Chemicals-Pigments-Metals Division
Hammond, Ind.



Typical gas porosity in 85-5-5-5 alloy is removable by copper oxides. Courtesy Battelle Memorial Institute and the Tin Research Institute

IN their article[1] on "Manufacture of Bronze Boiler Drop Plugs" Messrs. Kline and Davidson of the Southern Pacific Railroad say, "In making drop plug bodies no scrap returns are used—only new metals—with the exception of heavy copper since it has been found that heavy scrap trolley copper performs better than new ingot in that the film of oxide on the trolley metal counteracts a tendency to absorb hydrogen."

The experience of these investigators must not be unique, for the writer has heard many foundrymen extoll the virtues of using scale-coated trolley wire or other oxidized scrap to produce castings of bronze, brass and copper containing a minimum of gas porosity.

In fact, it seems likely that the work of Pell-Walpole in England and Dr. Eastwood, formerly of Battelle Memorial Institute, on unsoundness caused by gases in copper base alloys, actually placed on a controllable plane the procedures often used by the old-time foundryman when he searched the scrap pile for heavily oxidized material in order to assure himself the most in sound castings. The work[2] referred to is, of course, the use of oxidizing fluxes—in particular, copper oxide, for removal of harmful gases.

The Glidden Co., as one of the principal manufacturers of copper oxides, has watched with more than passing interest the increased application of these materials to eliminate hydrogen porosity, and the data in this article is taken from case histories of organizations actually using the process. The information is as brief as possible, and is given with a minimum of theory so the practical foundry man will have the why-when-how-cost details in a nutshell, and can apply the procedures easily to his own problems. In Table I the use of copper oxide is compared with other methods of obtaining oxidizing conditions during melting.

The why of using copper oxides is simple. Most authorities agree that hydrogen picked up during melting is a major cause of unsoundness. There are those who think it possible that soluble carbon or other materials than hydrogen may be a cause.

From a practical standpoint, however, the facts are that proper use of copper oxides will eliminate or reduce unsoundness, so exact causes are not absolutely essential. With the removal of this gas or other material, physicals are raised, lead is better distributed in leaded alloys, plating surfaces are improved, and porosity scrap losses are lowered.

The basic theory of the above is not too complex. Eastwood proved that 0.0000022 per cent by weight of hydrogen dissolved in copper-base alloys would result in finished castings with 1 per cent voids. The solution of this problem[3] is simply to keep hydrogen from coming in contact with the molten metal or to eliminate it once present.

Probably the most common source of hydrogen is from moisture. Water vapor is present in the combustion products of the oil or gas flame. It can come from incompletely dried furnace linings. There is evidence to in-

(*Continued on page* 230)

TABLE I—Evaluation of Methods to Maintain Oxidizing Conditions in Melting Copper-Base Alloys

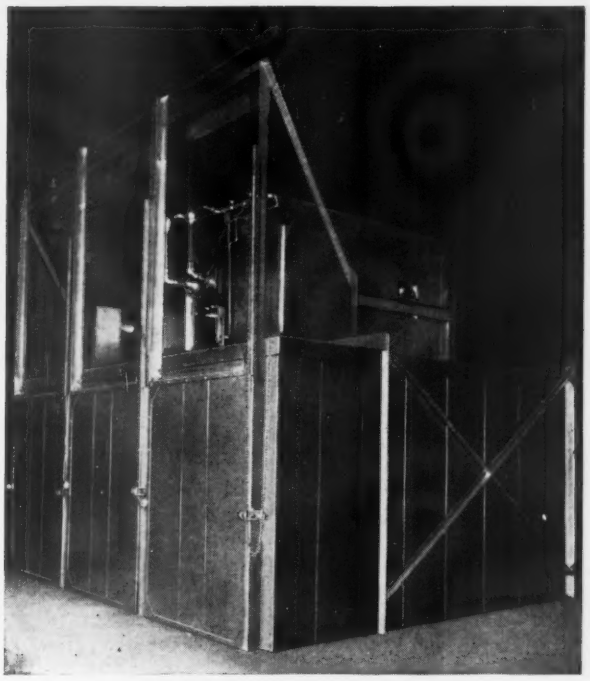
No.	Method of Supplying Oxygen	Advantages	Disadvantages
1	Copper Oxide	Introduces no contaminating metals or materials. Known quantity of oxygen supplied. Cheap. Safe. Copper is recoverable. Gives up oxygen as required. No appreciable attack on crucibles or linings	One extra step
2	Closely controlled melting atmosphere	Introduces no contaminants. Not an extra step. Safe. No problems of lining or crucible attack	High capital outlay for furnace controls and lab equipment. No real control of amount of oxygen supplied—may require excess phos copper. Requires highly specialized personnel
3	Other metal oxides such as manganese and aluminum	Controllable oxygen supply. Manganese oxides are relatively cheap	Reduction of metal oxide may throw metal off impurity specs. Nickel oxide is expensive. Manganese and nickel oxides are often in critical supply. One extra step. Manganese oxide may attack linings and may give up oxygen too fast
4	Saltpeter and metal carbonates	Cheap. Amount of oxygen controllable	Very fluid salts often cause glassy slag inclusions in castings. Extra step. Give up oxygen fast. Attack lining & crucibles
5	Blowing with air	Cheap	Dangerous if water is in air line. Also water neutralizes effect. Not readily controllable. May overoxidize. Extra step. Loss of tin and zinc
6	Copper Scale	Slightly cheaper than copper oxide	Usually damp, and this defeats purpose. Sometimes has iron to contaminate. Oxygen content varies and is low

A LOT MORE THAN FANS DUCTS, HEATERS AND PANELS GO INTO . . .

LANLY FOUNDRY OVENS

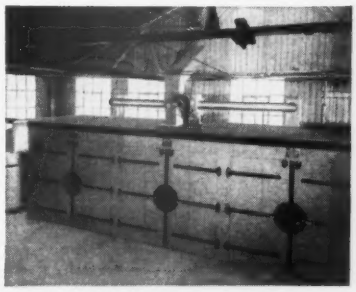
The proper adaptation and utilization of the essential component parts in every LANLY OVEN for maximum operating efficiency and economy, is a certainty being proved every day in foundries throughout the country. Specialized knowledge evolved from long experience and close cooperation with our customers enables us to design and erect better foundry ovens.

Upon receipt of information covering your needs, we will submit a proposal for an oven that will be thoroughly guaranteed as to construction and performance.



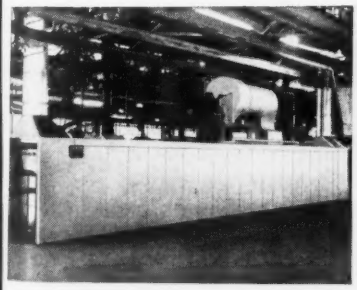
3 COMPARTMENT RACK TYPE OVEN

Uniformally heated by one compact, high capacity, air heater serving all compartments. Each compartment accommodates two core racks 4'-0" wide x 7'-0" long x 6'-0" high, loaded end to end.

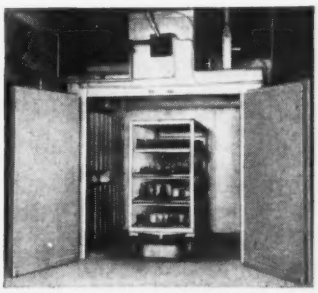


Three Compartment Rack Type Oven

Lanly Car Type Oven



Continuous Core Blacking Oven



De-waxing Oven

Combination Rack and Drawer Type Oven

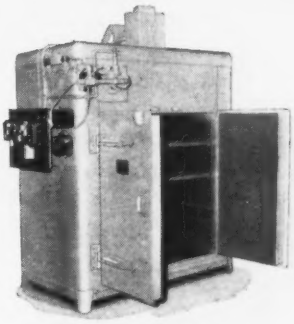
Plaster Mold Drying Oven

LANLY FOUNDRY OVENS

THE LANLY COMPANY • 780 PROSPECT AVE

CLEVELAND, OHIO

WRITE FOR THE LATEST CATALOG AND FACTS ON ANY INSTALLATION



Shelf Type Core Oven

HOW TO HAVE YOUR CAKE

. . . AND *Eat* IT, TOO

There are certain disadvantages to ordinary annealed abrasives: they have a low cleaning speed compared to chilled iron shot and grit, because the cutting action is comparatively light; and the presence of graphitic carbon leaves an undesirable graphite deposit on the work being processed that may interfere with subsequent finishing operations such as enameling, galvanizing, bonding, etc. On the other hand, annealed abrasives enjoy the tremendous advantages of longer abrasive life and much lower maintenance costs. The question is: how to enjoy the advantages without suffering from the disadvantages —how to have your cake and eat it, too.

Permabrasive annealed abrasives retain some of the hard iron carbides (that do the rapid cutting) in small, spheroidal form, with the result that you get a cleaning efficiency not usually associated with annealed abrasives; Permabrasive is made in three distinct hardness ranges with a narrow range of hardness in each, which makes it possible to shift from one grade to another as production problems demand.

You may be able to buy other brands of annealed iron abrasives for $10 to $20 less per ton, yet we'll guarantee your cleaning costs with Permabrasive to be LOWER, regardless of the price you are now paying. Write, wire or phone the nearest Hickman, Williams office and enjoy the advantages of annealed abrasives without the disadvantages.

H W

REG. U.S. PAT. OFF.

P.S. A complimentary copy of "A Primer on the use of Shot and Grit" is yours for the asking.

PERMABRASIVE* SHOT AND GRIT *IS PRODUCED EXCLUSIVELY BY*

THE NATIONAL METAL ABRASIVE CO., CLEVELAND, OHIO

AND SOLD EXCLUSIVELY BY

HICKMAN, WILLIAMS & COMPANY

(INCORPORATED)

CHICAGO • DETROIT • CINCINNATI • ST. LOUIS • NEW YORK • CLEVELAND

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*Licensed under U. S. Patent No. 2184926, U. S. Application No. 619602

(*Continued from page* 228)

dicate that in damp weather the water vapor can actually diffuse against heat through ceramics into molten metal. This might account for the increased use of copper oxides during periods of high humidity and actual snowy or rainy weather.

Other sources of moisture are the heat decomposition in the charge of impurities such as apple cores and sandwich bags. A very important source of moisture is the turnings or borings charge saturated with cutting oil. In fact, it would seem that moisture from this source is the only explanation that copper oxides often help in indirect arc electric furnace melting. Water can also be entrapped in ingot blow holes.

When water is heated to high temperatures it dissociates to a limited extent and an equilibrium is reached where the extent of dissociation is in balance by the recombination of the dissociation products hydrogen and oxygen, i.e., $H_2O = H_2 + 1/2\ O_2$.

Reaction Is Reversible

The laws of chemical equilibrium show that if one unit of this system is increased over and above the amount in equilibrium the reaction is driven in the opposite direction. In this case, if the oxygen in the molten metal is increased by copper oxide solution to a point above the amount coming from moisture in equilibrium, it will drive the reaction to the water side and use up all the hydrogen which is the culprit. The water cannot dissociate because of the high oxygen content of the melt so no hydrogen porosity can come from it. Not being able to dissociate it goes off as steam. The excess oxygen is then removed by phos copper or other nonsoluble gas forming material.

From the preceding it can be seen that there are times when the need for oxidizing agents is greater than at others. It has been our experience that when to use copper oxides depends a great deal on personnel temperament. There are those foundrymen who, when everything is running satisfactorily, see no need for insurance against possible trouble. These individuals use the oxide only when they have gassy castings or when they definitely expect trouble such as in rainy weather or when the charge is from dirty, oily borings and turnings. This saving on copper oxide in such cases is often greatly offset when gassy castings are discovered only after several cuts have been taken in the machine shop.

Other more cautious superintendents use copper oxide at all times, convinced that by so doing they elimi-

(*Concluded on page* 236)

AIR CIRCUIT DESIGN AND COST SIMPLIFIED BY AIR CYLINDER WITH BUILT-IN VALVE . . .

VALVE AND ALL OPERATING CONTROLS ARE INTEGRAL WITH THE CYLINDER. Only one air connection is required.

In pneumatic circuits the closer the valve to the cylinder, the faster, more economical and more efficient is the operation. The advantages of "close-coupling" are universally recognized by pneumatics engineers. But only Bellows offers the ultimate in "close-coupling" — an air cylinder and valve as one integral unit.

This unique Air Cylinder, with its built-in valve, is known the world over as the Bellows Air Motor. It has brought a new simplicity and effectiveness to pneumatics operation. It has created an entirely new conception of the use of air power in production processes.

In the decade since the first Bellows Air Motor was built almost 20,000 manufacturers have installed these compact power units. In many plants as many as a thousand Air Motors are in use; in many plants Bellows Air Motors operate 24 hours a day, month in, month out, building operating records of thirty, forty, even fifty million cycles.

No matter what you make, how big or how small your plants, you can use Bellows Air Motors to speed production and cut costs in a host of operations.

THIS 36-PAGE BOOKLET TELLS THE STORY . . . .

Just off the press. Filled with data every production man can use. Free on request.

Write Dept. FA953 The Bellows Co., Akron, Ohio. In Canada: Bellows Pneumatic Devices of Canada, Ltd., Toronto 18, Ontario, Canada.

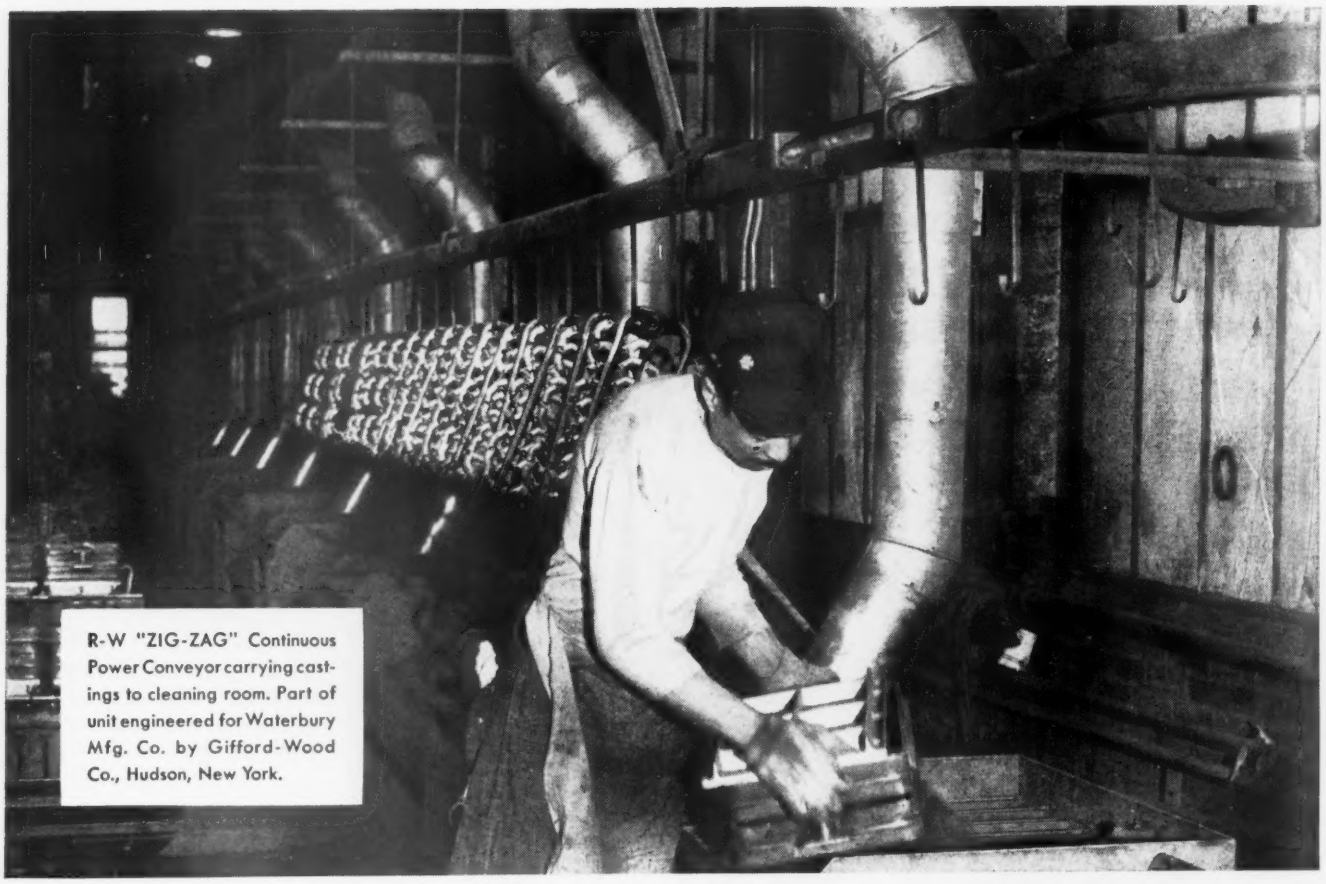
The Bellows Co.

AKRON 9, OHIO

697-A

***"CONTROLLED AIR POWER"* FOR FASTER, BETTER, SAFER PRODUCTION**

Modern industry chooses
Richards-Wilcox Conveyor Equipment



R-W "ZIG-ZAG" Continuous Power Conveyor carrying castings to cleaning room. Part of unit engineered for Waterbury Mfg. Co. by Gifford-Wood Co., Hudson, New York.

The key to materials handling efficiency is *flexibility* . . . the kind of flexibility you find in a R-W "ZIG-ZAG" Continuous Power Conveyor. It travels up, down, in, out and around . . . like water through a pipe . . . in most cases utilizing space that would otherwise be wasted. ZIG-ZAG moves steadily on the job, requiring a minimum of personnel and reducing bottlenecks and handling mishaps.

Because of these savings . . . in space, personnel, time and safety . . . the Gifford-Wood Company of Hudson, New York, designed and installed a complete Richards-Wilcox ZIG-ZAG Conveyor System for the Waterbury Manufacturing Company, Division of Chase Brass & Copper Co. This unit, designed to handle castings after shakeout, effected remarkable savings in production space, overall production time and maintenance costs.

• • •

Find out how you can raise efficiency, lower costs. Write today for consultation. There's no obligation on your part.

Enclosed Chain

Engineered for Economy and Flexibility

- Horizontal and vertical units alternate in a continuous chain traveling through special steel tubing.
- Complete flexibility for installation in any plant. Easily installed, easily changeable to conform to plant alterations.
- SAFE—all moving parts are fully enclosed.
- Low first costs. Low Power Factor.
- Standard horizontal or vertical curves —two-foot radius.

1880 RICHARDS WILCOX R-W AURORA 1953

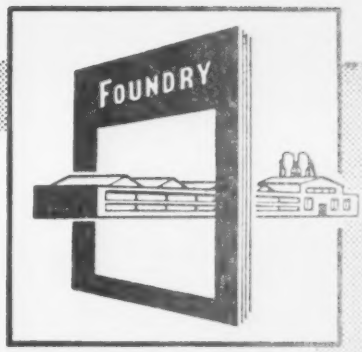
Reg. U. S. Pat. Off.

SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT • INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS • ELEVATOR DOOR OPERATING EQUIPMENT

Richards-Wilcox Mfg. Co.

MATERIALS HANDLING DIVISION

466 THIRD STREET, AURORA, ILLINOIS



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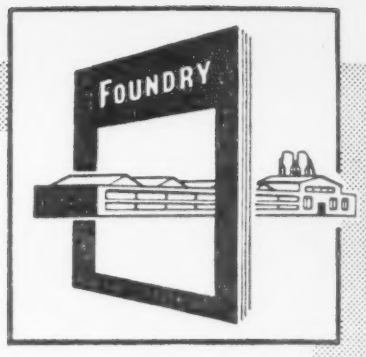

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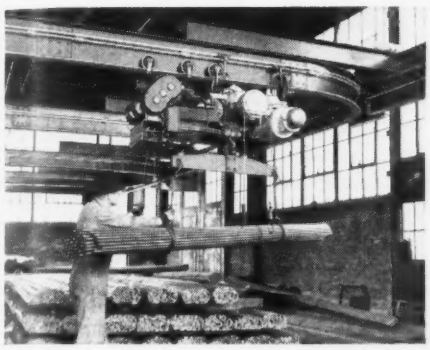
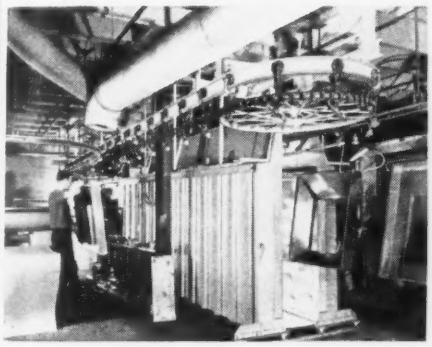


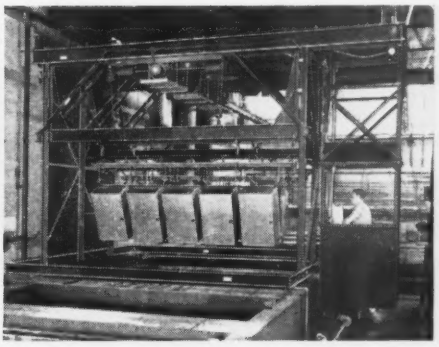
INCREASES TONNAGE

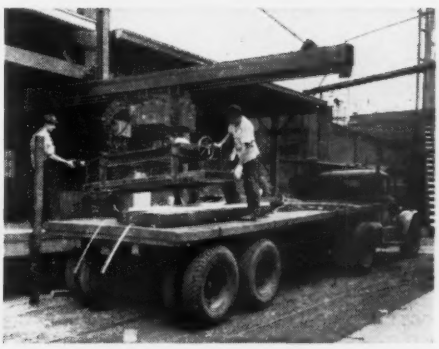
From 26 to 48 tons of steel rod per day was the increased movement produced by a properly engineered monorail system.

LOWERS COST

This simple system actually saved $150 in handling costs within four months of operation. No more sheet-by-sheet movement.







SAVES TIME

Passage, on monorail, of metal parts through infra-red dryer, cuts 70% from former drying time. All other handling in plant on monorail.

MORE CAPACITY

30% more capacity was added to metal cleaning process by handling a third more units on carrier with one man operation from cab control.

LESS LABOR

Operators claim to save 26 man hours per truck over former unloading time. Interlocking monorail cranes in the plant also reduce handling costs.

Write for Bulletin C-1
showing many more cases where MONORAIL PAYS!

THE AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE **CLEVELAND 7, OHIO**

(*Concluded from page 230*)

nate one cause of unsoundness. If cavities then occur they know it is not from gas absorbed during melting but from other reasons such as long freezing range shrinkage, surface porosity, and blow holes caused by gases from mold or core surfaces, entrapped air bubbles, etc.

When an organization is having trouble with gas one pound of copper oxide per hundred pounds of melt is used. When used as an "insurance policy" one-quarter to one-half pound per hundred is the rule.

At this point it should be mentioned that there are two copper oxides: (1) cuprous, which is red and contains roughly 11 per cent oxygen, and (2) cupric, which is black and contains 20 per cent oxygen. Most organizations use the black oxide as the cheapest source of oxygen, but some foundrymen feel that cuprous works best in brasses and use the red oxide as a result. There does appear to be some indication that cuprous (red) oxide dissolves into the melt more rapidly than black and may give slightly quicker action although the net result is the same and more of the red is required. Choice for use in this case is left up to personal preference.

For foundries which melt and pour from the same crucible, i.e., pit fire and nontilting furnaces, three methods of incorporating the oxide into the melt are used.

The first is to add the desired quantity of oxide to the charge of ingot and turnings, melt, skim, deoxidize with phos copper and cast.

The second is to partially melt down the charge, skim, stir in the oxide, add gates and risers if this is the procedure, complete the melt, skim, etc. as in the first method.

The final method is to plunge the oxide into the molten metal after skimming. In this case the oxide may be enclosed in a copper foil bag or put in a cup cast of the same alloy and plunged in the regular manner. Some stirring here is helpful. The melt is then skimmed and deoxidizer added as usual. This latter procedure is very effective but more complicated.

Where tilting furnaces are used mostly the oxide is placed in the bottom of the pouring ladle and then molten metal from the melting furnace is poured on top. The turbulence of the metal does the mixing. The ladle is then skimmed and deoxidized in the regular manner. The powdered copper oxide is usually contained in a thin paper sack or the amount may be volumetrically determined with a small cup and the loose oxide then dumped into the bottom of the ladle.

Copper oxides cost around 40 cents per pound, and 80 per cent of cupric oxide is copper that is recoverable, i.e., the copper goes into the melt if used correctly. Assuming 24 cents for copper, the oxygen is supplied for only 16 cents per 100 pounds of melt, or if used to the maximum extent the cost is under two-tenths of a cent per pound of melt. Since the quantity used is more often around one-quarter pound per hundred the cost of this insurance against gas problems from melting conditions is only around 4 cents per hundred pounds of melt.

To sum up, it has been clearly established that copper oxides are helpful in eliminating unsoundness due to gas absorption during melting. On the other hand, it should be pointed out they do not help where cavities might be formed due to relatively long freezing ranges. Neither are copper oxides effective on surface porosity and blow holes caused by gases evolved from mold or core surfaces, or dressings, or by air bubbles entrapped during the pouring of the metal.

Copper oxides do not replace phos copper. The products serve two entirely different purposes. Copper oxides first remove the hydrogen, then the phos copper gets the excess oxide. Both are used in the same melt.

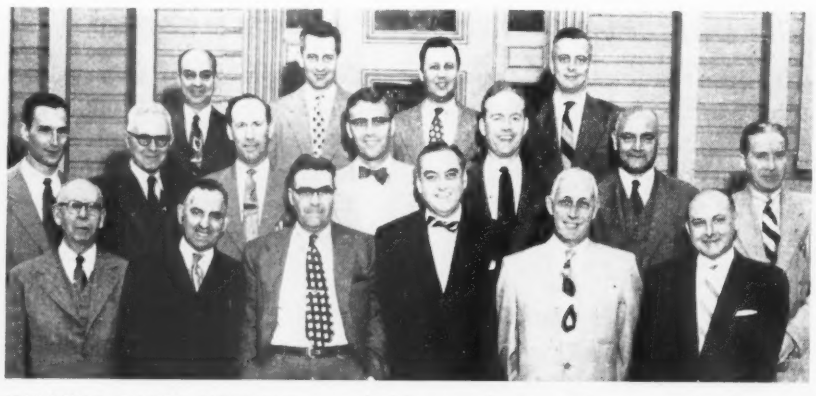
That the procedure is becoming widely used is evidenced by the following from the article[4] in FOUNDRY on Cupro-Nickel Castings by James S. Vanick of the International Nickel Co.: "Briefly, copper melting practice is employed. Avoidance of sulphur, hydrogen and carbon is practiced. Other impurities are excluded. Oxidation of the metal is desirable during melting and is achieved by adding 1½ ounces of nickel oxide or 3 ounces of copper oxide per 100 pounds of metal to eliminate hydrogen as well as other oxidizable impurities."

Develop Own Practice

The exact procedures must be worked out by each foundry as local conditions dictate. The above formula and ways of using are only guides. It should be remembered the process does not work on alloys with easily oxidizable constituents such as silicon and aluminum. In other words, do not use copper oxides on aluminum or silicon bronzes.

One final use for copper oxides as a foundry tool is the removal of elements harmful to the specifications, in cases where such elements exist in small quantities. Excess phosphorus, aluminum, lead, and iron are typical and frequently are oxidized out during melting by mixing copper oxides into the charge.

Acknowledgement for help is given the following organizations and individuals who provided data on their procedures: Bunting Brass & Bronze Co., Toledo, O., C. E. Eggenschwiler; Union Brass & Metal Mfg. Co., St. Paul, Jacob Kluge; Beckett Bronze Co., Muncie, Ind., George R. Slick; Tin Research Institute Inc., R. J. Nekervis; C. Lee Cook Mfg. Co., Louisville, W. G. Probst; Acme Aluminum Alloys Inc., Dayton, O., Richard Driscoll.



GENERAL SALES MEETING was held recently by Acheson Colloids Co., Division of Acheson Industries Inc., at Port Huron, Mich. Branch managers and home office executives heard Alden Crankshaw, sales manager, present his policies, and discussed new uses of Acheson's colloidal graphite, molybdenum disulphide dispersions and other products. Front row, left to right are: G. F. Willson, T. Seddinger, E. R. Hayes, W. E. Lang, G. C. Giles and W. Ewart. Middle row: D. H. Lynn, E. A. Lampman, W. F. Sentner, M. L. Bunting, R. W. Montague, Mr. Crankshaw and M. E. Dougherty. in back are F. M. Hunter, A. T. Olsson, D. G. Weaver and P. E. Yoder

References

1. *American Foundryman*, March 1951
2. Fourth Annual AFA Foundation Lecture, 1946, by G. H. Clamer.
3. Tin Research Bulletin, "How to Make Improved Chill Cast Tin-Bronzes"
4. FOUNDRY, March, 1952.

These furnace operators cut fuel costs, reduced cycle time with the LIGHTEST WEIGHT insulating firebrick

Here's "production-line" proof of actual savings made by replacing heavier brick with the lightest weight insulating firebrick made today—B&W IFB.

LARGE FORGE FURNACE
Comparative Furnace Tests

	Standard Firebrick	B&W IFB	Change With B&W IFB
Furnace Output, pieces per hour	70	100	Increased 43%
Heating-Up Time, minutes	210	35	Reduced 83.3%
Cycle Time, minutes	50	30	Reduced 40%
In addition:			
Fuel consumption during heating up			Reduced 83%
Fuel consumption during operation			Reduced 50%

ANNEALING FURNACE
Comparative Furnace Tests

	Standard Firebrick	B&W IFB	Change With B&W IFB
Heating-Up Time, hours	52	31	Decreased 40%
Total Cycle Time, hours	131	114	Decreased 13%
Fuel Consumption, lbs./cycle	12,792	8,159	Decreased 36%
Yearly Output, tons	946	1,100	Increased 16%

MAGNESIUM MELTING CRUCIBLE FURNACE
Comparative Furnace Tests

	Ordinary Firebrick	B&W IFB	Change With B&W IFB
Fuel Consumption BTU/HR	1,000,000	500,000	Decreased 50%
Control	100 to 150 F overshoot of critical pouring temperature	no overshoot of critical pouring temperature	

What's behind these remarkable records of B&W IFB? Light weight for one—in fact B&W IFB is lighter in weight than any other insulating firebrick. This means they store and conduct less heat, provide faster heating-up time and lower fuel consumption. These brick also respond rapidly to changes in heat input, assuring excellent temperature control.

Get all the facts on B&W Insulating Firebrick from your local B&W Refractories Engineer. He may be able to point the way to lower production costs for you.

R-483

B&W REFRACTORIES PRODUCTS—B&W Allmul Firebrick • B&W 30 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars

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Activities of Foundry Groups

Wisconsin

EIGHTEENTH annual golf outing and dinner of Wisconsin Chapter of the AFS was held July 17 at Maplecrest Country Club near Kenosha, Wis. In spite of an occasional drizzle, about 115 played golf.

Part of the fun for those attending was guessing the total weight of a group of five castings, one each of aluminum, gray iron, bronze, steel and malleable. All had been painted to hide the grain. The largest casting, aluminum, was the fooler, frequently being guessed to be gray iron. However, the winner, Victor Jenson, Standard Foundry Co., Milwaukee, came within one ounce of the correct total weight and won a portable radio.

Each person present was given a set of tools, handy for home use, wrapped in a cloth roll. This valuable attendance prize supplanted the usual door prize drawing.

However, there were prizes for the best golfers. To top off the day's fun, a good floor show was staged after the buffet dinner.

The committee responsible for the arrangements of the successful outing were: Norman Amrhein, chairman; H. F. Runkel, co-chairman; Clarence Gehrman, S. E. Shaver, Leonard Gratz, D. Gerlinger, W. V. Knapp, E. Sadek and K. O. Johnson.—*John E. Hubel.*

Buffalo Conference To Feature New Molding Methods

THREE newly developed molding methods will feature discussion subjects at the Niagara Frontier Regional Foundry Conference to be held at the Statler Hotel, Buffalo, Sept. 17-18.

Six New York, Pennsylvania and Canadian chapters of the American Foundrymen's Society are co-operating in sponsoring the meeting, with Western New York Chapter, of which Joseph M. Clifford, Atlas Steel Casting Co., Buffalo, is chairman, acting as the host chapter.

In the discussion of new molding methods, Bernard N. Ames, New York Naval Shipyard, Brooklyn, N. Y., will review recent developments in shell molding. Pressure molding will be described by Thomas E. Barlow, Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago. Dietert precision molding, or the "D" process, will be covered by Frank S. Brewster, Harry W. Dietert Co., Detroit.

General conference chairman is Grant S. Diamond, Electro Refractories & Abrasives Corp., Buffalo. Serving as co-chairman are Carl A. Harmon, Hanna Furnace Corp., and Henry Sproull, A. P. Green Fire Brick Co., also of Buffalo. A well rounded program, including technical sessions devoted to ferrous and nonferrous metals, pattern production, molding and sand practice, has been arranged by a program committee headed by Edmund J. Burke, Hanna Furnace Corp., Buffalo.

Representing the participating AFS chapters in the conference arrangements are: Central New York Chapter, John A. Feola, Crouse Hinds Co., Syracuse, N. Y.; Eastern New York Chapter, Edwin S. Lawrence, General Electric Co., Schenectady, N. Y.; Northwestern Pennsylvania Chapter, Charles F. Gottschalk, Cascade Foundry Co., Erie, Pa.; Ontario Chapter, Alex Pirrie, Standard Sanitary & Dominion Radiator Ltd., Toronto, Ont.; and Rochester Chapter, Neal F. Clement, Rochester-Erie Foundry Corp., Rochester, N. Y.

Program details follow:

Thursday, Sept. 17

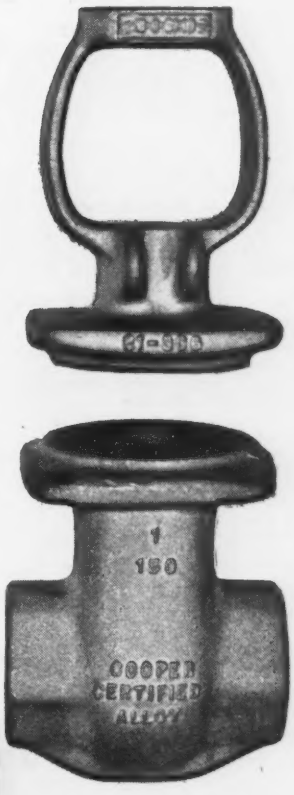
8:30 a.m.—Registration
9:30 a.m.—Welcoming Addresses
9:45 a.m.—Shell Molding Panel. "C" Process, Bernard N. Ames, New York Naval Shipyard, Brooklyn, N. Y. Chairman: Ezra Kotzin, Curtiss-Wright Corp., Buffalo
12:15 p.m.—Luncheon: Guest speaker—F. J. Dost, national vice president, AFS. "Pressure Molding," T. E. Barlow, Eastern Clay Products Dept., Chicago. Chairman: Henry Sproull, A. P. Green Fire Brick Co., Buffalo
2:15-3:30 p.m.—Sectional meetings:
Gray Iron: "Factors that Influence Properties of Gray Cast Iron," H. H. Wilder, Vanadium Corp. of America, Detroit. Chairman: Walter F. Morton, the Anstice Co., Rochester, N.Y.
Nonferrous: "Some New Aluminum Bronze Developments," J. S. Vanick, International Nickel Co., New York. Chairman: John A. Feola, Crouse-Hinds Co., Syracuse, N. Y.
Pattern: "Co-ordinative Function of Pattern Equipment and Castings," A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee. Chair-

(*Concluded on page* 240)

NORTHEASTERN OHIO Chapter of the AFS held its annual summer outing on June 27 at Twin Lakes Country Club. Top view shows, left to right, President Frank Cech, Outing Chairman L. P. Robinson and Mike Ross. Scene at lower left shows some of the chapter members listening to announcements of golf and door prizes. At the lower right are Mike Ross and Henry Trenkamp

"Here's why Cooper Alloy uses GENERAL ELECTRIC SHELL RESINS"

—says Morton L. Katz, Chief Shell Mold Engineer, Cooper Alloy Foundry Co., Hillside, New Jersey



At left—conventional sand-molded stainless-steel valve bonnet and body.

At right—shell-molded bonnet and body. Notice superior surface finish and legibility of identification on shell-molded castings.

"General Electric resins are used extensively in our shell-molding operations because of their extremely high strength, good reproductivity and minimum reaction with molten stainless steel. By selecting proper resins, we are able to assure high productivity and superior quality."

This experience of a foundry that was "into" shell casting from the beginning is worth *your* consideration. The new shell process, offering smoother surface finish, better dimensional stability and greater yield per man-hour than conventional sand-casting methods, may mean important savings for you and your customers.

Ask G.E. about shell casting

General Electric offers you a "team" of products to help you get maximum benefits from shell casting. *G-E phenolic shell resins help* you make strong, dimensionally accurate sand shells with smooth surfaces and sharp contours. *SM-55 silicone parting agent* helps you obtain quick, easy release of shells from patterns. *Send the coupon today for free samples and technical data!*

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Please send me:

Data	Sample	
( )	( )	G-E phenolic shell resin (medium cure)
( )	( )	G-E phenolic shell resin (fast cure)
( )	( )	SM-55 silicone parting agent

I want this for: ( ) Reference purposes only ( ) An immediate application on_____

Name_____

Firm_____

Street_____

City_____ Zone____ State_____

(*Concluded from page 238*)

man: Harold Brakeman, City Pattern Works, Syracuse, N. Y.

Steel: "Factors Affecting Quality of Cast Steel," T. N. Armstrong, International Nickel Co., New York. Chairman: T. H. Burke, Worthington Corp., Buffalo

3:45-5 p.m.—Sectional meetings:

Gray Iron: Subject to be announced. Chairman: Alex Pirrie, Standard Sanitary & Dominion Radiator Ltd., Toronto, Ont.

Nonferrous: "Nonferrous Castings," H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass. Chairman: E. S. Lawrence, General Electric Co., Schenectady, N. Y.

Pattern: "Patterns for Malleable and Steel Foundries," J. M. Kreiner, National Malleable & Steel Castings Co., Cleveland. Chairman: Richard Wade, Wade & Horrocks Inc., Buffalo

Steel: "Sand Reclamation in the Steel Foundry," C. B. Jenni, General Steel Castings Co., Eddystone, Pa. Chairman: W. Weir, Dominion Foundries & Steel Ltd., Hamilton, Ont.

7 p.m.—Banquet—introduction of guest speaker, Grant S. Diamond, Electro Refractories & Abrasive Corp., Buffalo. "Foundry People as They Come and Are," Ralph L. Lee, Birmingham, Mich. Chairman: Joseph M. Clifford, host chapter chairman, Atlas Steel Castings Co., Buffalo

Friday Sept. 18

8:30 a.m.—Registration

9-10 a.m.—Educational session: Speaker: Otto Guenther, New York State Institute of Applied Arts and Sciences, Buffalo. Chairman: A. A. Diebold, Atlas Steel Castings Co., Buffalo

10 a.m.-12 noon—Shell Molding, "D" Process, F. S. Brewster, H. W. Dietert Co., Detroit. Chairman: Warner Bishop, Archer-Daniels-Midland Co., Cleveland

12:15-2 p.m.—Luncheon: "Mechanization of Molding" (motion picture), C. V. Nass, Beardsley & Piper Division, Chicago. Chairman E. J. Burke, Hanna Furnace Corp., Buffalo

2:15-3:30 p.m.—Sectional meetings:

Gray Iron: Subject to be announced. Speaker: Vern Patterson, Climax Molybdenum Corp., Detroit. Chairman: N. F. Clement, Rochester-Erie Foundry Co., Rochester, N. Y.

Nonferrous: "High Tensile Bronzes," William Young, Wm. Kennedy & Sons Ltd., Owen Sound, Ont. Chairman: W. Jones, Canadian Westinghouse Co. Ltd., Hamilton, Ont.

Steel: Subject to be announced. Chairman: Max T. Ganzauge, General Railway Signal Co., Rochester, N. Y.

Malleable: "Malleable Foundry Practice," F. D. Rote, Albion Malleable Iron Co., Albion, Mich. Chairman: D. J. Merwin, Oriskany Malleable Iron Co., Oriskany, N. Y.

3:45-5 p.m.—General meeting — "Foundry Sands," C. A. Sanders, American Colloid Co., Chicago. Chairman: J. O. Ochsner, Crouse-Hinds Co., Syracuse, N. Y.

Mo-Kan

TO conclude the 1952-53 chapter year, members of the Mo-Kan Chapter of the AFS met May 13 at Fairfax Airport private dining room, Kansas City. Principal speaker was J. S. Schumacher, chief engineer, Hill & Griffith Co., Cincinnati, whose talk was entitled, "Foolproof Sand Works for Wide Range of Castings."

Officers elected for the coming year are: Chairman, William N. Chivvis, Magnus Metal Division, National Lead Co., Topeka, Kans.; vice chairman, Lloyd Canfield, Canfield Foundry Supplies & Equipment, Kansas City, Kans.; secretary, Howard Julian, Blue Valley Foundry, Kansas City, Mo.; treasurer, Herman Schwickrath, Prier Brass Mfg. Co., Kansas City, Mo.

Newly elected directors are; John F. Redman Jr., Redman Pattern Works, Kansas City, Mo., retiring chairman; Henry Deterding, Sonken Galamba Co., Kansas City, Mo.; R. A. Posch, Arpocalloy Co., Kansas City, Mo.; Thomas Chadwick, Witte Engine Works, Kansas City, Mo., and C. W. Boettcher, Black, Sivalls & Bryson Inc., Kansas City, Mo.—*C. W. Boettcher, Black, Sivalls & Bryson Inc.*

Southern California

UNDER direction of new officers for 1953-54—Hubert Chappie, National Supply Co., president; Charles Gregg, Gregg Iron Foundry, vice president; William Baud, Mechanical Foundry Division, Machinery & Chemical Corp., secretary-treasurer—the chapter has scheduled a Sand School for May, 1954. The school is expected to attract 200 students. The course's instructor will be F. S. Brewster, vice president and general manager of Harry W. Dietert Co., Detroit.—*Norman Lynn*

GRAY IRON FOUNDERS' SOCIETY

To Mark Silver Anniversary

THE Gray Iron Founders' Society, Inc., will hold its 25th silver anniversary meeting at the Hotel Jefferson, St. Louis, Oct. 7-9, 1953.

Highlight of the three-day meeting will be an address by Walter Williams, under secretary of commerce, Washington, who will discuss the problems of small business and how the new federal administration expects to deal with them.

Another feature of this anniversary meeting will be a discussion panel Thursday afternoon on modern foundry management techniques. Panel members are S. C. Massari, manager, Foundry Division, Hansell-Elcock Co., Chicago, chairman; James H. Smith, general manager, Central Foundry Division, General Motors Corp., Saginaw, Mich.; C. R. Culling, president, Carondelet Foundry Co., St. Louis; and T. W. Curry, director of manufacturing research, Lynchburg Foundry Co., Lynchburg, Va.

Other speakers on the program will be W. S. Williams, works simplification director, Lynchburg Foundry Co.; Stuart Heinritz, editor, *Purchasing* magazine; and Tom Collins, director of public relations, City National Bank, Kansas City, Mo.

Members of the meeting's Entertainment Committee are: J. B. Frielingsdorf, Banner Iron Works; C. R. Culling, Carondelet Foundry Co.; Frank C. Hatten, Century Foundry Co.; W. E. Illig, Banner Iron Works; Paul Kluge, Tower Grove Foundry Division; George Mellow, Liberty Foundry Co.; Harry S. Sanders, American Foundry & Mfg. Co.; C. B. Shanley, Semi-Steel Casting Co., all of St. Louis, and Ralph Hill, East St. Louis Castings Co.

The program follows:

Wednesday, Oct. 7

10 a.m. Meeting—retiring and new board of directors

6 p.m.—President's reception and dinner.

Thursday, Oct. 8

9:45 a.m. Business session

Report of the president—H. J. Trenkamp

Report of the treasurer—W. O. Larson

Report of the executive vice president—Donald H. Workman

Report of the technical director—Charles O. Burgess

Presentation of Committee Reports

11:15 a.m. Keynote Address

Speaker: (to be announced later)

12:30 p.m. Industry luncheon

Speaker: Hon. Walter Williams, under secretary of commerce, U. S. Department of Commerce, Washington.

2:30 p.m. Business session

Panel Subject: "Management Techniques."

Chairman: S. C. Massari, manager, Foundry Division, Hansell-Elcock Co., Chicago

Panel Speakers: James H. Smith, general manager, Central Foundry Div., General Motors Corp., Saginaw, Mich., "Management Technique in the Foundry Industry"

C. R. Culling, president, Carondelet Foundry Co., St. Louis, "Management Yardsticks"

T. W. Curry, director of manufacturing research, Lynchburg Foundry Co., Lynchburg, Va., "An Economic Evaluation of Shell Molding"

4:15 p.m.—GIFS committee meetings

5:30 p.m.—Social hour

6:30 p.m.—Industry banquet—informal

Friday, Oct. 9

9:15 a.m.—Business session

Speaker: W. S. Williams, work simplification director, Lynchburg Foundry Co., "Work Simplification in the Foundry"

Speaker: Stuart Heinritz, editor, *Purchasing* magazine

1 p.m.—Industry luncheon

Presentation of citations, awards and prizes in 1953 redesign contest

Speaker: Tom Collins, director of public relations, City National Bank, Kansas City, Mo.

Labor Bulletin Surveys Foundry Employment

The United States Department of Labor's Bulletin 1130 reprints the section on metalworking from its 1951 Occupational Outlook Handbook and makes it available in separate form. Entitled "Employment Outlook in Metalworking Occupations," the booklet covers foundry, machine shop, forging, welding and other fields.

It surveys the nature of each, discusses the geographical distribution of its components, outlines the types of jobs each requires, examines the education and training workers require and lists representative earnings. The employment outlook in each field receives particular attention.

The foundry industry receives close study, over a quarter of the publication being devoted to it. Individual consideration is given to such foundry occupations as molding, coremaking, chipping and grinding, melting and patternmaking. The booklet is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 30 cents per copy.

Do you know these facts about vanadium?

Vanadium is available in quantities for every application.

Ferrovanadium is one of the most versatile, economical ferro alloys. It gives new life and endurance to virtually every type of alloy steel and iron. Its applications range from watch springs to giant forgings. *And a little goes a long way,* with small additions often doing the work of large additions of other alloys.

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VCA mines in the U.S. and overseas offer a reliable, growing source of the finest vanadium ore.

New and enlarged facilities at the VCA plant at Cambridge, Ohio, assure a plentiful supply of highest-quality Vancoram Ferrovanadium for every iron and steel application.*

In the years ahead, Vanadium Corporation will continue to keep ahead of the growing demand for vanadium throughout American industry—producing increased quantities of Vancoram Ferrovanadium for both military and civilian use.

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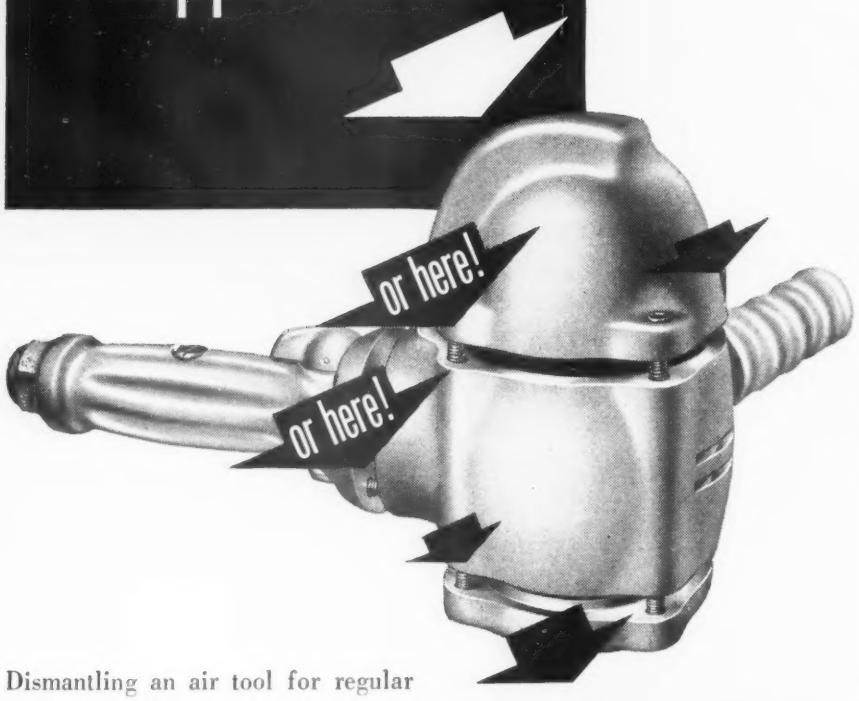
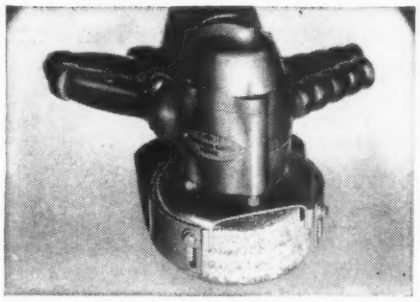


Dismantling an air tool for regular inspection and maintenance is one way to insure better air tool performance.

Unfortunately, it's also one way to wear out or strip threads in tool housings—and that means re-tapping the holes and using oversize screws, which adds to tool maintenance time and costs.

Fortunately, this can't happen to you—if you're using Buckeye tools—because every threaded hole in Buckeye tool housings has a *replaceable* Heli-Coil insert. That means you always drive screws into a hardened steel thread—so you can't wear or strip threads in the housing—ever.



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IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario

Offers 2-Week Course in Cobalt 60 Radiography

The first of a series of two-week training programs in cobalt 60 radiography in industry will be offered early this fall by Technical Operations Inc. The program will cover health physics, the handling of cobalt 60 and other gamma sources and the practical and theoretical aspects of industrial radiography.

Time will be divided about evenly between lectures, demonstrations and question and answer periods on one hand and actual practice including experiments in shielding, radiation measurement and the taking of radiographs on the other. Applicants should have previous technical training or experience in some field related to foundry practice, steel fabrication, mechanical engineering or radiography.

The program has the supplemental purpose of providing the basis for approval by the Atomic Energy Commission for purchase of cobalt 60. Enrollment will be limited. Further details are available from Technical Operations Inc., 6 Schouler Court, Arlington 74, Mass.

AMA Offers New Booklets

Booklets 209 and 210 in the Manufacturing Series of the American Management Association are entitled "Guides to Meeting Tomorrow's Production Needs" and "Industry Enters the Atomic Age," respectively. The first contains seven articles, including a long section on automation and the pushbutton factory. Number 210 contains four articles, all pertaining to industry and atomic energy. Both books can be purchased from the association at 330 West 42nd St., New York 36, for $1 to members, $1.25 to nonmembers.

Book Review

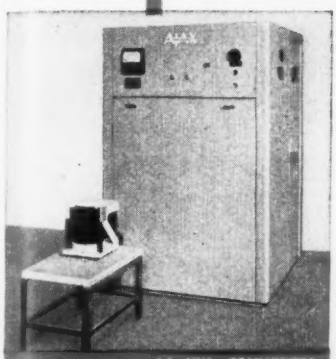
Tool Engineers' Data Book, by Gerhard J. Gruen, cloth, 219 pages, 6 x 9 in., published by Reinhold Publishing Corp., New York. Price $5.50.

As its title indicates, this book is meant to supply convenient, rapid access to any tables, formulas, constants and specifications needed by practicing tool engineers and designers. Some of the most recent developments covered are said never to have appeared in book form before their inclusion in this volume.

Data on general properties of special alloys; heat treatment of special alloys and stainless steels; spot identification of metals, alloys and plastics; and conversion tables, mathematical tables and other materials are included.

Starting Point For Better Melting

AJAX-NORTHRUP CONVERTER-TYPE FURNACES



20 KW. CONVERTER

STEEL

BRASS

These compact, efficient furnaces are used in all leading metallurgical laboratories, and by the major producers of precision castings.

"Almost every new alloy since 1916 started in an Ajax-Northrup furnace."

The 20 Kw. converter will melt 17 pounds of steel in 40 minutes. Maximum capacity is 30 pounds of steel, or 60 pounds of bronze. The larger 40 Kw. unit melts faster, will handle up to 50 pounds of steel. The 6 Kw. unit melts a pound of steel in 8 minutes.

All units may be used for heat-treating, forging, sintering or other applications—no problem to change from one to the other.

Ajax-Northrup converters are completely self-contained. They can be placed anywhere in your plant where water and power are available, require no special foundation or wiring — and they're certified to meet F.C.C. regulations.

Many of today's "blue chip" industries started with a 20 Kw. Ajax-Northrup converter.

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AJAX ELECTRIC FURNACE CORPORATION
AJAX ELECTRIC COMPANY, INC.
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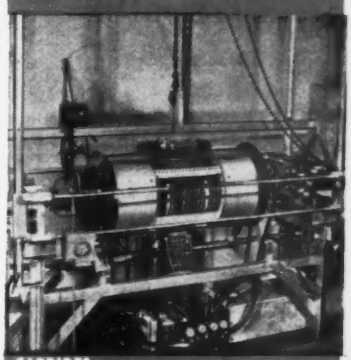
RESEARCH



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Since 1916

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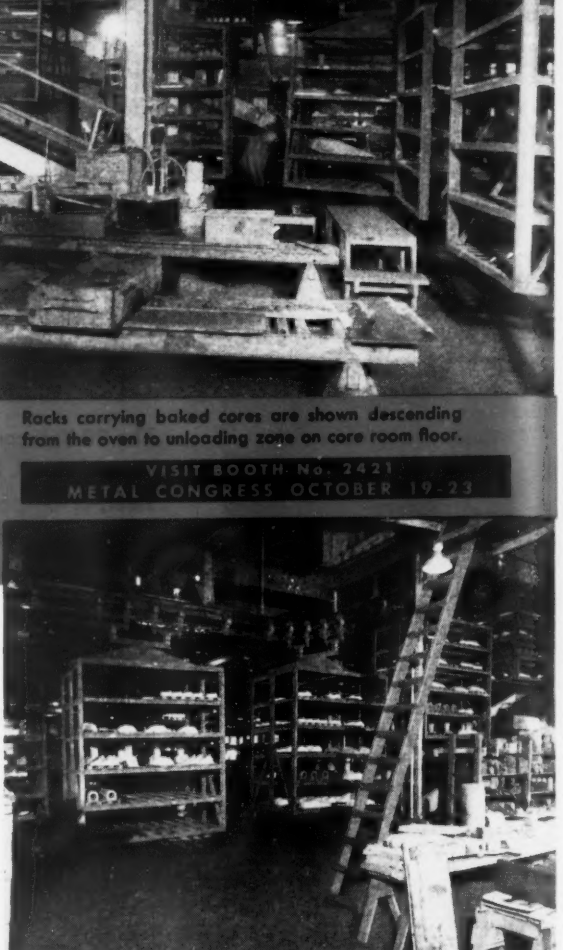
CORE CAPACITY INCREASED 125% with DESPATCH CONVEYORIZED CORE BAKING SYSTEM

Racks carrying baked cores are shown descending from the oven to unloading zone on core room floor.

VISIT BOOTH No. 2421
METAL CONGRESS OCTOBER 19-23

● Steel Division of Riverside Foundry, Bettendorf, Iowa, selects DESPATCH Core Baking Oven in the production of Armor Steel Castings for Tanks and other Military Equipment!

"Enough in time" is the slogan of the steel division at Riverside in meeting rigid defense production schedules for Armor steel castings used in the Government Tank Program. Helping to uphold that slogan is this DESPATCH Core Baking System with overhead conveyorized oven. Installed especially for this program, it operates 20 hours per day, 6 days per week and requires most of the 210 tons of sand used per week in the Riverside Operation. Replacing 3 batch type ovens, the system has increased core capacity at Riverside by 125%.



Oven is bottom entry design 21′ x 60′, 2 pass, heated by direct gas fired burners. Cores are baked three hours at 400° F.

HOW ABOUT YOUR FOUNDRY? ARE YOU SATISFIED WITH YOUR CORE ROOM OUTPUT?

Now is the time to break that core room bottleneck with a DESPATCH Conveyorized Core Baking System. With modern DESPATCH equipment in your core room you will enjoy increased core production, higher core quality and lower operating and maintenance costs. A DESPATCH representative near you will give you all the details.

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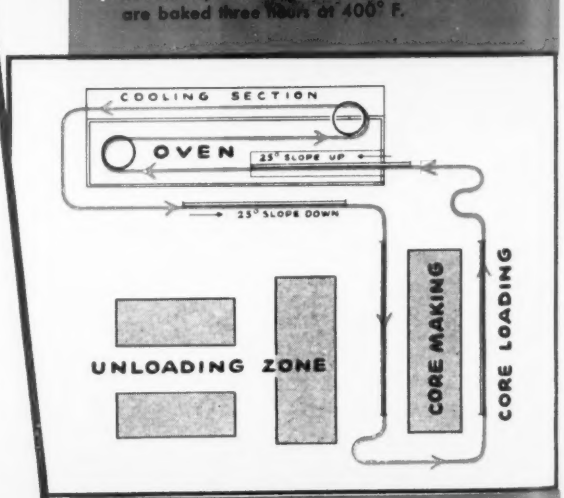

This schematic drawing shows route of the 480′ continuous conveyor from core making and loading area, through baking and cooling zones, to unloading area.

DESPATCH OVEN COMPANY

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PIONEERS IN ENGINEERING HEAT APPLICATIONS FOR INDUSTRY

Adventures of Bill

By PAT DWYER

Illustration by RICHEY

EXTENT to which times and manners change was brought home to me forcibly when I read a brief news item in some paper or magazine recently dealing with the typical activities of a small pack of wolves somewhere north of the Soo. This, as many people know, is the anglicised, familiar and denatured version of the Sault Sainte Marie, the original and old time French name bestowed by the *voyageurs* and *coureurs du bois*—forerunners of Kilroy—on the fall or rapids of the St. Mary's river connecting lakes Superior and Huron.

Whether this is the river Sainte Marie that joyously clogged the air waves through the radio day and night several years ago—the magical, mystical home of a glamorous and marvelous maiden—I am not prepared to state. Up to the present I have taken no steps or formulated no plans to dispel my ingnorance on this point. What! You too?

According to the—ah—presumably accurate and truthful news item, a small pack of wolves crazed with hunger had chased a man across a field or a farm or something like that on the outskirts of the town, but had failed to catch him. The entire story, including the man's name and address—but leaving the number of wolves in a small pack to the imagination—just made a filler paragraph for a spot at the end of a column devoted to some other subject that escapes me for the moment.

Not so long ago, in fact well within the memory of those who still have all their teeth and other accessories, the wild and ruthless hunting wolf pack was well up among the favorite and well worn props in every professional, and many amateur would-be writer's bag of tricks. Whenever the action began to drag, whenever the author realized the need for quickening the reader's flagging interest, he—the author of course—threw off the leash and speeded the ravening wolf pack on the trail of the hero.

In some instances the hero was alone, either on foot or on horseback. If on foot, he invariably jumped at least 10 ft 6 in. to swing into the lower branch of a friendly tree a split second before the hungry jaws of the leading wolf snapped at his moccasined dangling feet. In this connection it may be interesting to note that this tree jumping technique was known and practiced by popular heroes long before Tarzan picked it up from his friends the great apes somewhere in Africa.

In other instances where the hero was on horseback, the gallant steed, neighing in the keenest and most agonizing terror, collapsed within 100 yards—never 99 or 101—but exactly 100 yards of the old log hut in the forest. Quickly disengaging his feet from the stirrups, and pausing only long enough to bid his faithful equine friend a brief and affectionate adieu, the hero sprinted the intervening 100 yards while the devilish pack was tearing the body of the horse to pieces and gulping the fragments in a manner that certainly would not meet with the approval of leading dieting authorities. On the other hand, as you might say, leading authorities have been known to stick their necks out too far. Wolves have died from various causes, but up to the present so far as our researches extend, none has died of acute indigestion induced by hastily gobbling the first free and hearty meal, catch as catch can and no holds barred.

Filled with vim, vigor, vinegar, venom and horse meat the pack then figuratively joined hands and danced ring-a-rosy around the haven of refuge, the hut in the wildwood, the dear little cot in the dell. All the intrepid young man in the coonskin cap, buckskin shirt and beaded leggings had to do was to dodge from loop hole to loop hole and pick 'em off (the wolves to you) one by one with his trusty rifle until the entire pack was exterminated and started full fed and comfortable for the happy hunting grunds.

Where the author desired to increase the suspense, heighten the dramatic value, pack an extra punch in the chapter and incidentally add a few dollars to the value of a space-rate story, he exhausted the hero's ammunition at a stage when approximately half the wolf pack still was unexterminated. The courage, strength and ferocity of this fraction verged on the incredible when one considered that the component parts had been traveling for a couple of

Modern hero is faster and rougher on the draw than gay Young Lochinvar

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months without food or water in the wilderness of ice and snow between the scene of the story and their original home away back beyond hell-and-gone to the north of Hudson Bay.

When all hope seemed lost, windows broken, door loose on the hinges, wolves scrambling down the chimney and poking their sharp evil faces through every opening in the walls; when in fact—despite the author's reputation of never having lost a hero—you were willing to bet at least two to one that the lad was doomed this time, what happened?

Picking up a large flat stone from the hearth with the laudable intention of mashing the first wolf to a pulp, the hero discovered an opening into which he immediately dropped. An opening which ultimately led him to a vein of gold in the heart of the hills, rich beyond the d-r-e-a-m-s of avarice. A second secret passage conducted him to his friends and freedom.

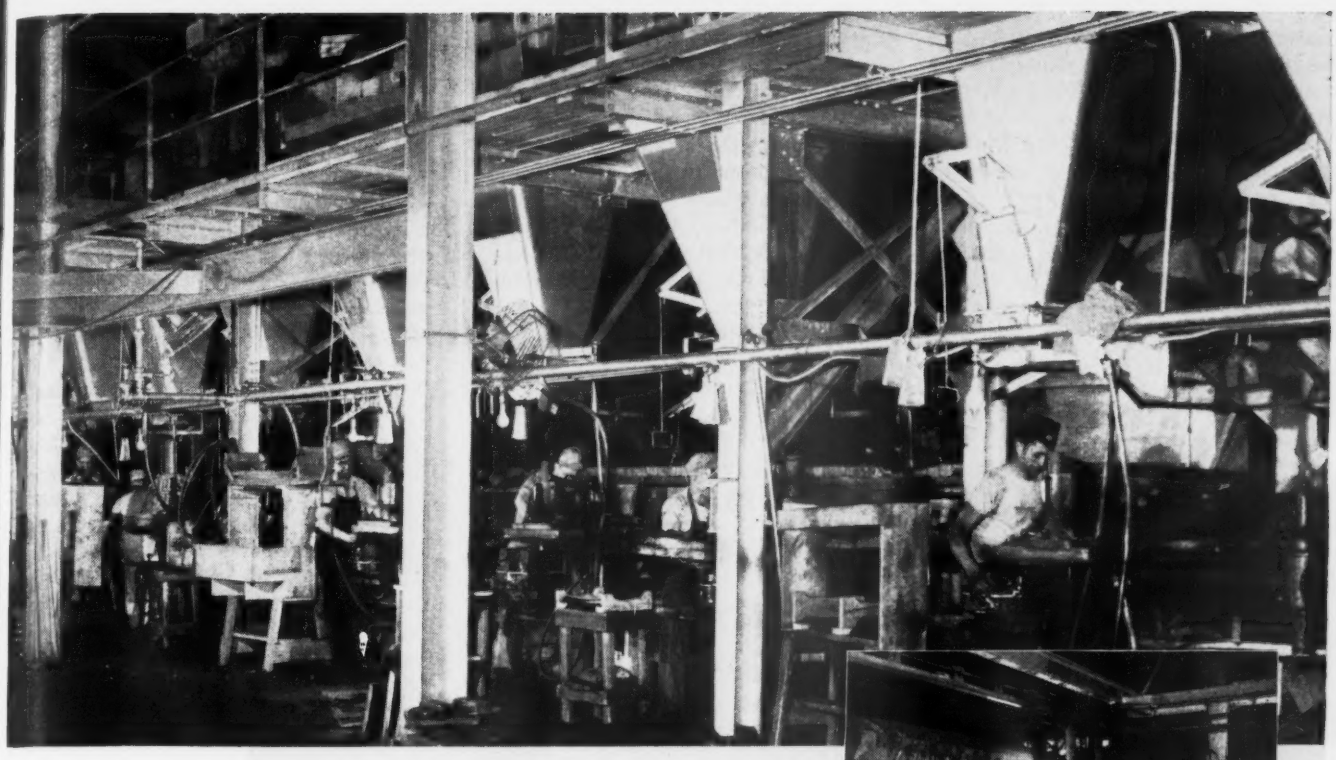
This was the plain straight-forward type of wolf story, retailed primarily for masculine readers who thrilled to the spirit of adventure and the bracing atmosphere of the great open spaces. Primal emotions were stirred. The lust for blood that has persisted since the cave man first established the right to have and to hold by his ability to get in the first shrewd blows with a club or a small boulder, was aroused and satiated in these stories.

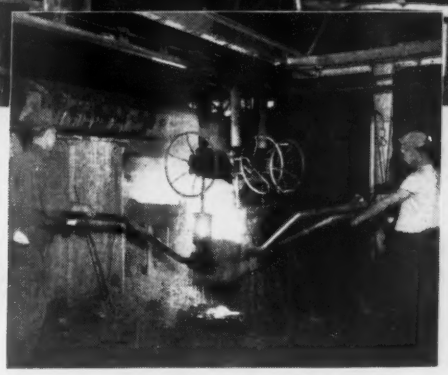
Without any conscious effort the reader became the principal character. He tasted the sweets of victory and he almost went down in defeat. When a pack of wolves attacked him, it was just too bad—for the pack. Jealously he counted each one picked off in the fight and actually breathed a sigh of pleasure and content when the tally showed every wolf present and accounted for, with a bullet hole fair between the little vicious eyes.

The second type of wolf story was designed to appeal to both feminine and masculine readers. With that end in view the GIRL was introduced in the first chapter. Thereafter she is smuggled into every scene, gums up the game generally, constantly falls over cliffs, into rivers or into the hands of the oily villain and his bunch of renegades. Most of the hero's time, and the time of the other characters in the story, is devoted to rescuing the beautiful doll from situations into which the average child of ten would not stumble.

In the great wolf scene she is lost on the prairie in a blizzard with no one but her faithful pony to breathe down the back of her neck and prevent her from freezing to

(*Continued on page* 248)





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Knight-Engineered MODERNIZATION PROGRAM IS INSTALLED WITHOUT INTERRUPTING PLANT OPERATION—

AND RESULTS IN INCREASED OUTPUT OF 33⅓%

This successful program was put into operation—step by step—without substantial interference to existing production. Continued operations during the modernization process were made possible by careful scheduling of necessary changes.

Modernization was accomplished without an increase in floor space and resulted in improved product quality, better working conditions, and a stronger competitive position for the company.*

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(*Continued from page* 246)

death. Comes the dawn. A lull in the storm, *and* the inevitable pack of wolves bearing down in full cry. Under other and more favorable conditions the frightened pony would dash away and leave her to the mercy of the enemy. Of course that never would do in the present intance with the wolves a scant half mile away and no succor in sight. No, no Percy. The word is not spelled s-u-c-k-e-r.

Jumping on the pony's back she rips the spurs into him and knows nothing more (as usual) until the hero ranges alongside on his prancing black stallion, snatches the lady under one arm, pivots the prancing stallion on the two hind feet and then dashes for the distant ranch and freedom. In the meantime the wolves have not been idle. Interference of a third party has stirred their righteous indignation. They shift from second into high, drool a little more at the mouth, raise their voices a little higher and "In a word (to quote from an original) strain every effort to overtake the beautiful maiden and her gallant rescuer, e'er they attain their distant goal." And that's a very good place to leave 'em.

When I read the foregoing composition for Bill's benefit, he admitted that with a few exceptions, he agreed I was on solid ground, particularly the last sentence.

"Those wild wolf stories might suit some people, but I don't think they would appeal to the honest lads who write to me every now and again to supply answers to a wide variety of questions. For example, a man wrote me recently that he was collecting data on conventional methods for filing and indexing drawings and patterns. How should he list patterns used in various combinations. How are production machines numbered, as a straight serial list, or, as plain lathe No. 47, multiple lathes No. 3, etc. How is equipment classified in an alphabetical index. For example, would a furnace employed in annealing pipe be listed under *F, A, E* or *P,* thus: Furnace Annealing, Annealing Furnace, Electric Furnace, or Pipe Annealing Furnace.

Owing to variation in detail of operation, size of the plant, character of the product and many other factors, nearly every foundry which has an index or card filing system for patterns and drawings, has developed one to fit its own peculiar conditions. Tendency among the majority of men is to follow along the line of least resistance. Coupled with this in some instances we find a resistance to any innovation which entails initial expense. Thus in many foundries we find one man carries a complete record in his mind of drawings, patterns, customers, casting weights, equipment and every other factor which enter into the production of castings.

The system employed where the foundry is part of a manufacturing plant would not serve in a general jobbing foundry catering to a miscellaneous list of customers. The system in use in a specialty shop concentrating on a few items would not apply in a foundry where the variation in product is almost infinite.

In a general jobbing foundry the drawings and patterns may be classified first under the customers' names. Each of these general classes then is subdivided under as many heads as may be considered necessary. Each pattern is given an identifying letter and number. In a manufacturing plant, for example, the patterns could be grouped first under such general headings as pumps, engines, rock crushing machinery, hydraulic, etc. Individual patterns under these headings then might be given identifying letters and numbers. One series might

(*Concluded on page* 250)

FOR EXTRA SERVICE and GREATER ECONOMY
Use BUCKEYE Silica Firestone!
• FOR SOAKING PITS
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Nature has endowed Buckeye Silica Firestone with every feature needed in modern refractory material. Its widespread efficiency, long life and attractive cost are well known to foundry and steel mill executives everywhere.
Under conditions where comparative tests have been made, Buckeye is first everytime! Its natural, uniformly-balanced combination of chemical and mechanical properties makes its superiority unquestioned. Its microscopically open and porous structure provides exceptional resistance to heat and abrasion.
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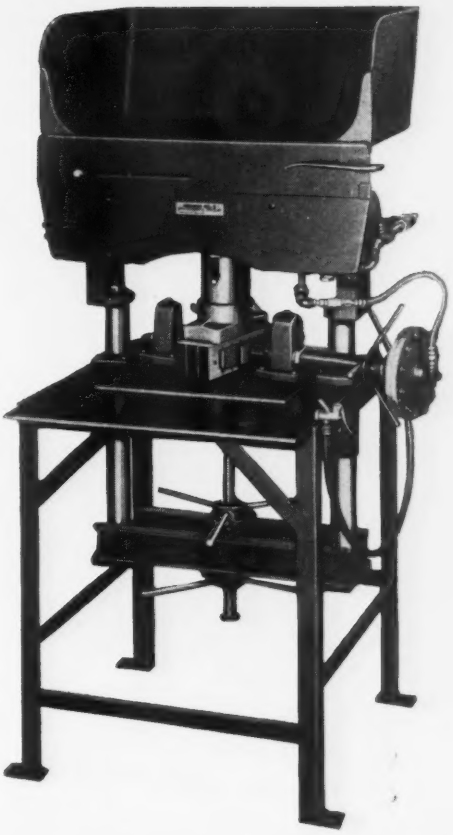
Redford CORE BLOWERS

Assure MAXIMUM Production With MINIMUM Effort



THE NO. 2 STATIONARY MAGAZINE TYPE

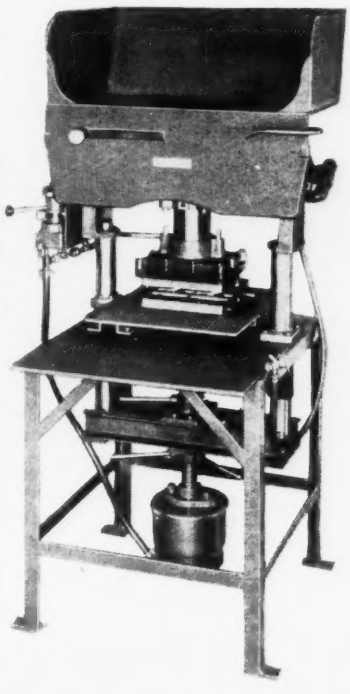
8 OUTSTANDING FEATURES:

1. Large stationary work area.
2. Large sand supply hopper.
3. Stationary sand magazine.
4. Easy accurate locating of core boxes.
5. Quick change magazine heads.
6. Quick adjustment for different height core boxes.
7. Quick change, fully adjustable, vertical clamping attachment.
8. Actuating one handle clamps the core box, blows the core and releases the core box, in two seconds.

CAPACITY: Cores up to 5#

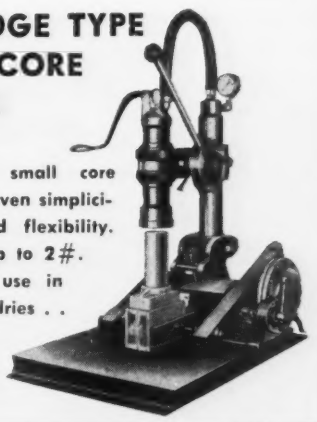
Write for Specification Bulletin "F"

THE No. 2-D CORE BLOWER



A fast and accurate DRAW TYPE core blower for small work—has stationary sand magazine and many additional features assuring maximum production. Quickly adjusted to accommodate core boxes not requiring the draw feature. Can be equipped with clamping attachment for vertically split core boxes.

THE CARTRIDGE TYPE BENCH CORE BLOWER



The original small core blower . . . Proven simplicity, speed and flexibility. Makes cores up to 2#. Thousands in use in American Foundries . .

Write for Specification Bulletin "G"

SIX FEATURES:

1. MAXIMUM SAFETY—Operator must use both hands at once to clamp core box and blow cores.
2. ACCURATE DRAW—Stationary sand magazine and long lead on draw table shaft assure accurate draw.
3. ADJUSTABLE LENGTH OF DRAW—Quickly changed without changing height of table.
4. FLEXIBILITY—Easy adjustments permit use of draw feature even on short run jobs. Draw type magazine heads having removable blow plates are interchangeable with regular No. 2 magazine heads.
5. CORE BOX VIBRATION—Controlled by keeping draw valve handle depressed during draw operation.
6. PROVEN—The No. 2-D is being used in leading foundries everywhere. Backed by the Redford reputation for quality equipment.

Write for Specification Bulletin "D"

Redford IRON & EQUIPMENT CO.

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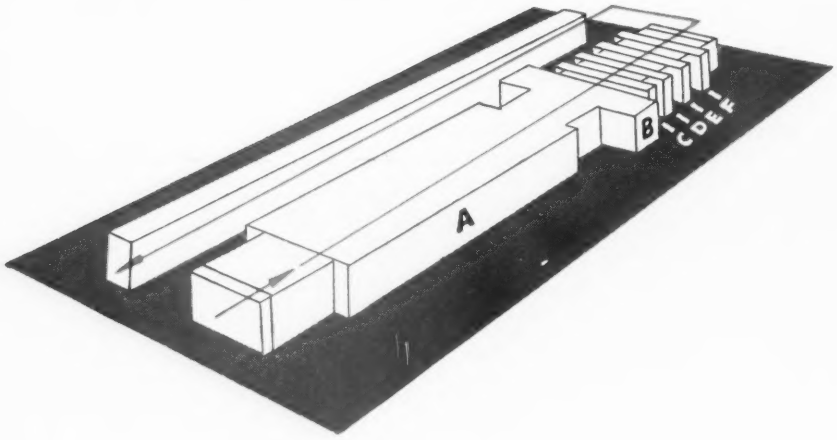
Heat Treat Furnace Layout

by Holcroft... 2nd of a Series



A Annealing furnace
B Hot salt quench
C Wash
D Acid bath
E Wash
F Oil dip

Volume Production Castings
Annealed, Descaled, Desanded

This "U-type" furnace layout by Holcroft ties right into the production line of a large automotive plant.

The unit anneals, descales and desands 10,000 pounds of castings each hour. After annealing, the stock is dipped in a salt quench, rinsed in water, bathed in acid, water-washed again, and dipped into a soluble oil to prevent rust. A return conveyor automatically brings the trays back to the loading point.

Unusual layouts like this present no particular problem for Holcroft. After all, it's an inherent part of the job to be completely responsible for the work—from the time it is to be heat treated to the time it's ready for finishing operations. It's the type of work Holcroft does well. Holcroft & Company, 6545 Epworth, Detroit 10, Michigan.

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Paris 8, France

(*Concluded from page* 248)

be marked A-1, A-2 and so on up to A-1000. A second series starts with 2A-1 and so on. Articles on the numbering of patterns have been presented on several occasions in FOUNDRY.

The same general rule holds for the filing and indexing of equipment data. All the information is grouped first under a number of definite heads, then redistributed under a number of lesser heads. For example, the first distribution might include all the equipment in the main divisions of the foundry and be listed under *Molding, Melting, Coremaking, Cleaning.* Each one of these is broken down as far as may be necessary and each item filed under the proper subhead.

The general rule in filing is to use the main term first with auxiliary or explanatory terms after it. Thus the annealing furnace would be filed under the letter *F* as *Furnace, pipe annealing,* and would be grouped with all other furnaces in use in that particular plant.

The same rule holds with the classification of machines. In the foundry each one is given a number and this number is filed in a list under a heading indicating the type of machine. Each filing card also can carry any additional necessary information, either for production or appraisal purpose. For example, *Molding Machine No.* 1, combined jolter, squeeze and pattern draw, maximum size flask 24 x 36 x 10 in., New (or second-hand 1950), The Jolter Machine Co., $600.

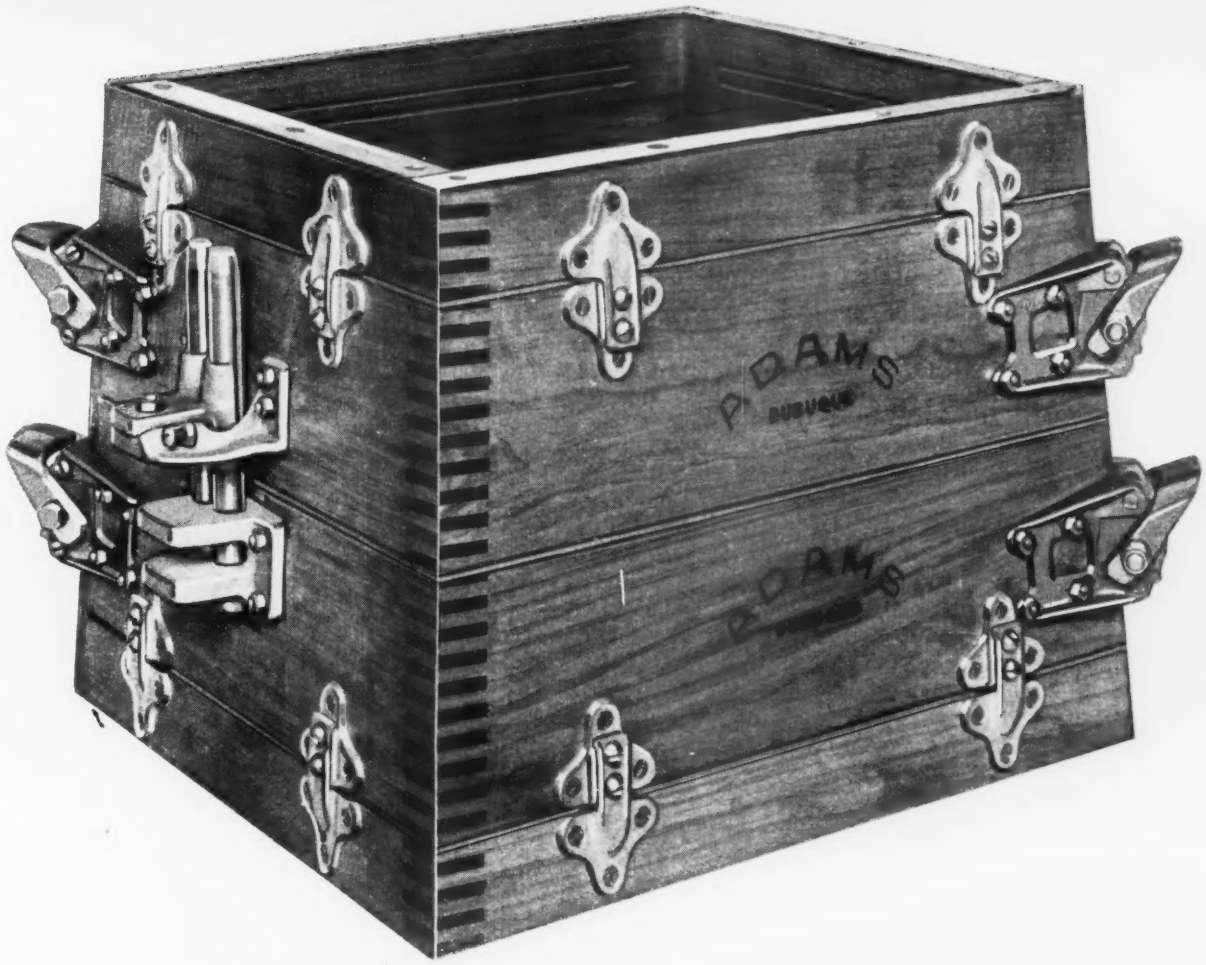
AMA Publishes Booklets

Three booklets for management use, two of them in the organization's personnel series, have been published by the American Management Association, 330 West 42nd St., New York 36.

In the personnel series, booklet 150 is *The New Climate of Union-Management Relations,* subtitled "Including a forecast of general trends under new government and union leadership." Booklet 152, *Planning for Worker Security and Stability,* is subtitled "with a case study in employee economic education."

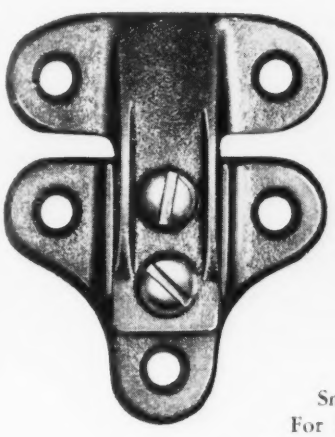
The third publication, research report 21, *A Company Guide to Effective Stockholder Relations,* is a manual of objectives and methods for insuring a flow of accurate, complete company information to the financial community and the investing public.

The personnel series booklets are available to members for $1, to nonmembers for $1.25. The research reports are $1.50 and $2.



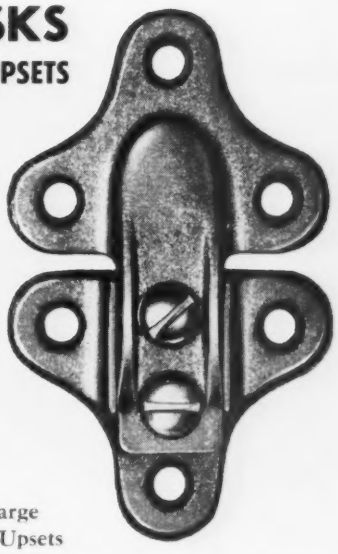
ADAMS CHERRY EASY-OFF FLASKS

MODERNLY EQUIPPED WITH ADAMS CHERRY UPSETS



ADAMS UPSET BRACKETS

FOR CHERRY UPSETS



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For Upsets
Through 2″ Deep

FOR ALL
ADAMS CHERRY FLASKS

Large
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Over 2″ Deep

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MOLDING MACHINES
and
FLASK EQUIPMENT

DUBUQUE, IOWA, U.S.A.

USES OF HIGH-ALLOY CASTINGS

Involve More Severe Service

RECOGNITION of the greatly increased temperatures, pressures and corrosive environments utilized in modern industrial processes was the main theme of a recent conference on high-alloy castings held at the Harbor Island, N. C., corrosion testing station of the International Nickel Co. Members of the Alloy Casting Institute, a technical association of high-alloy foundries, as well as manufacturers of industrial furnace and other products using high-alloy castings, discussed the effect of these increasingly severe conditions on both materials and design.

One of the most pressing problems in this field—corrosion of alloys by liquids at elevated pressures and above-boiling temperatures—was discussed by Dr. M. G. Fontana, Ohio State University, and R. Matters, Allis-Chalmers Mfg. Co. Although chemical processing is continually moving in the direction of higher temperatures and pressures, with attendant increase in severity of corrosion, very few data are available in the technical literature on this subject. Dr. Fontana presented corrosion rate data developed in special studies being conducted by the Alloy Casting Institute. When these studies are completed, specific recommendations regarding the use of cast high alloys under these conditions probably will be made.

Corrosion resistance of cast stainless alloys containing ferrite as a constituent was discussed by Walter A. Luce, Duriron Co., Dayton, O. Although consumers are sometimes disturbed by the fact that ferrite-containing alloys are magnetic, and that certain reducing acids may attack the ferrite in a selective manner, Mr. Luce pointed out that service data indicate this component is not deleterious to corrosion resistance in the media where these cast materials are normally recommended. A current ACI-sponsored research project is designed to delineate specifically those areas of corrosion service where the presence of ferrite should be given consideration in alloy selection.

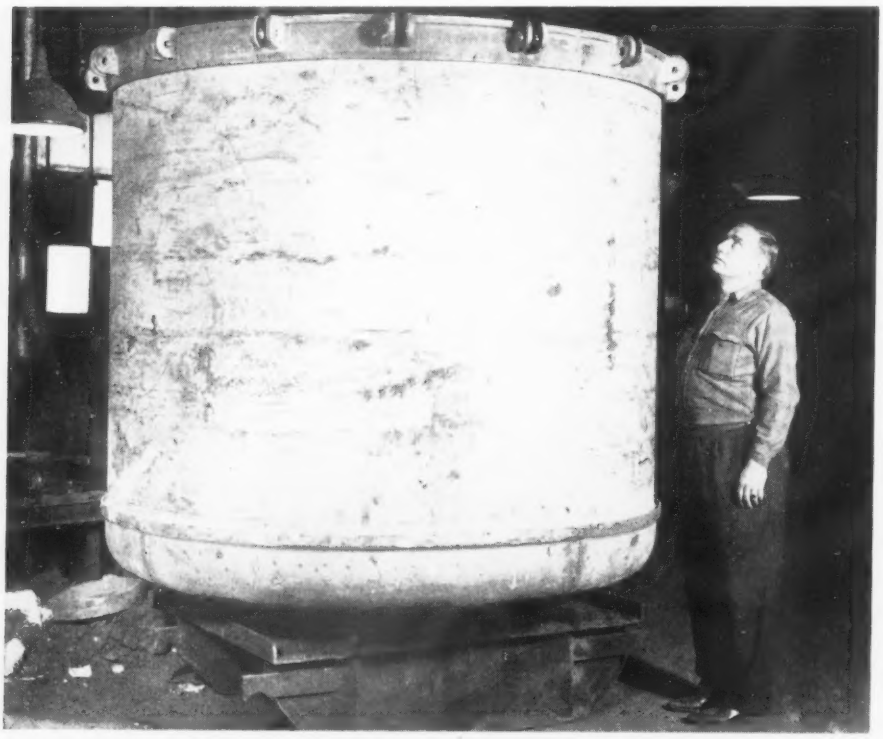
Perhaps of greatest interest was the section of the program devoted to heat-resistant alloys. Much discussion was centered on problems of alloy selection in furnace design. A possible approach to further alloy conservation was described by Don Helman, metallurgist, Ohio Steel Foundry Co., who explained that several high-alloy foundries have been experimenting with recently developed ceramic coatings, with the aim of lengthening service life of castings and allowing continuous operations at above-normal operating temperatures.

Another objective would be the reduction in the amount of strategic elements, such as nickel, which are necessary in the high-nickel-content alloys presently required for high-temperature use. The studies are not yet completed, but it is evident that successful use of these ceramic coatings depends on whether the coatings remain continuous or unbroken.

Operating temperatures of industrial processes are constantly being increased and demand is arising for metals to use at extremely high ranges. Norman A. Matthews, American Brake Shoe Co. research laboratories, described the need for a cast alloy that will retain high strength when exposed continuously to 2000-2200°F temperatures. Since many industrial furnace manufacturers were present, Mr. Matthews outlined the scope of the problem by directing specific questions to them:

1. Should increased hot strength be gained at the cost of some ductility?
2. What is the minimum usable "creep strength" required for a typical furnace part?
3. What are the economics involved—in other words, how much are the users of high-alloy cast parts willing to pay for increased hot strength?

Mr. Matthews revealed that a start in this direction has been made by the National Alloy Division of the Blaw-Knox Co., another member of the Alloy Casting Institute, in its recently developed NA22H alloy, which contains 27 per cent chromium, 50 per cent nickel, and 5 per cent tungsten. However, the Alloy Casting Institute has authorized a research project at Battelle to develop an alloy for service above 2000 F, with strength characteristics similar to NA22H, but requiring smaller amounts of strategic elements.

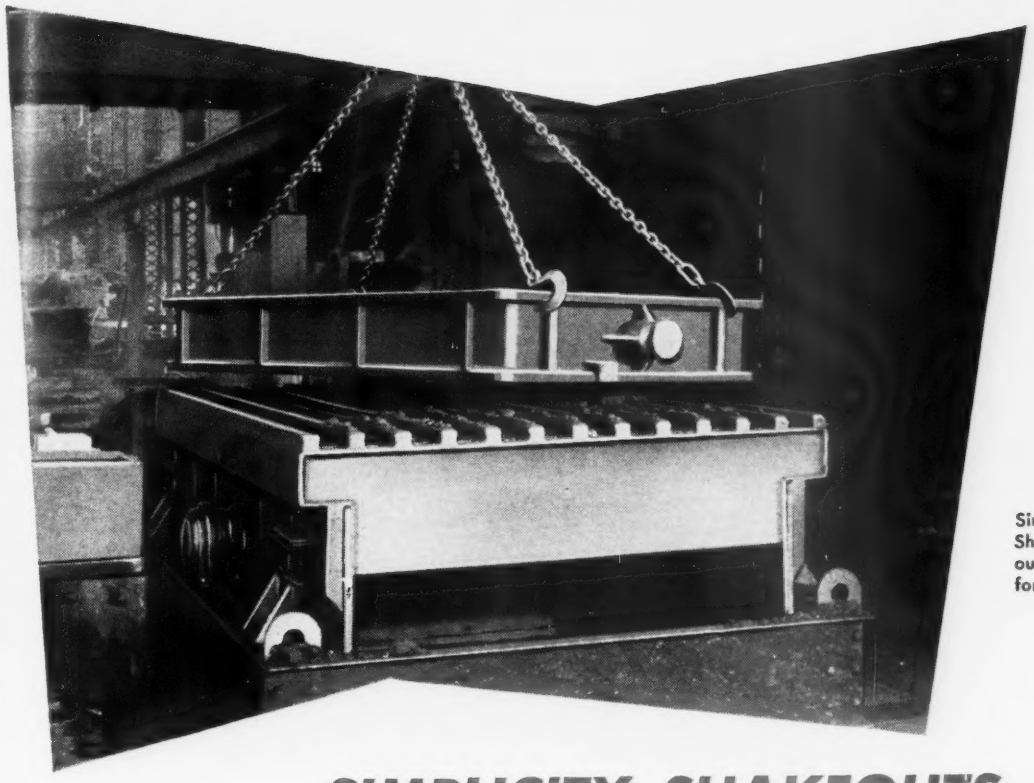


This high-alloy casting, a carburizing retort 80 in. in diam, was made of HT type alloy containing 35 per cent nickel and 15 per cent chromium. It was cast by the Ohio Steel Foundry Co. at its Springfield, O., plant

Safety Council Directory Lists 963 Safety Films

The 1953-54 edition of the *National Directory of Safety Films*, just published by the National Safety Council, lists 963 motion pictures and slide films for use in training personnel in occupational accident prevention. Films on home and traffic safety are included.

The directory also contains data concerning films in the related fields of first aid, fire prevention and civil defense. It will be kept up-to-date with quarterly supplements. Copies are available for 75 cents each from the National Safety Council, 425 North Michigan Ave., Chicago 11.



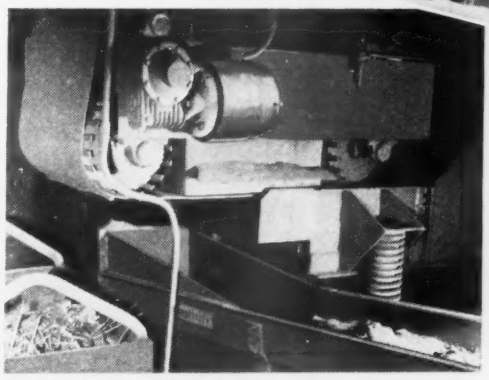
Simplicity Model OE 6′ x 10′ Shakeout does a thorough shakeout job on machine tool castings for Gisholt.

SIMPLICITY SHAKEOUTS

ON THE JOB AT GISHOLT MACHINE CO.

To insure a continuing supply of high quality castings for their machine tool production, Gisholt Machine Company of Madison, Wisconsin, recently installed Simplicity equipment as part of an extensive mechanization program for their foundry. A Simplicity 6′ x 10′ Shakeout turns out good, clean castings in record time. Under the shakeout which is mounted on a special sub-frame, a Simplicity Feeder that eliminates hang-up and bridging, delivers sand from the shakeout to a Simplicity VS conveyor. This conveyor, equipped with a magnetic separator that removes all metal particles, returns sand to the system. Like Gisholt, you can do a better job with Simplicity equipment when you build or modernize your foundry.

Under the rigid supporting sub-frame of the shakeout, a Model OA 4′ x 22′6″ Simplicity Feeder handles sand removal.



Feeder, at right, discharges sand to a Simplicity Model VS 20″ x 13′6″ Conveyor equipped with a Dings self-cleaning overhead magnetic separator discharging to a scrap bucket at the lower left.

135

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Follow Boards and Matchplates (II)

ABC of Foundry Practice

By PAT DWYER, *Engineering Editor*

A DEVICE for mounting several small patterns on a plate and in such relation to a center line that both cope and drag of a mold may be rammed on the same plate, is an adaptation of the cast iron transfer plate process, but presents many points of superiority in adaptability, ease of application and accuracy. Briefly stated, two duplicate frames are filled with plaster and take the place of the transfer plate. A detailed description presents many points of interest.

It is apparent that if one-half a symmetrical split pattern is mounted on a plate, all the half molds made on that plate will be alike. However, unless the half pattern is mounted definitely in relation to two lines, one drawn longitudinally and the other transversely, at right angles to each other and crossing in the center of the plate, it will be impossible to ram the other halves of the mold on the same plate. The advantage of using only one plate lies in the fact that the molder can make drags and copes alternately without losing time changing pattern plates. The method also is applicable in mounting patterns for cope and drag on adjoining machines where conditions warrant such an arrangement.

Procedure Is Described

The heavy cast iron plate is provided with ribs on the back. The face is machined to a true plane, after which a number of holes are drilled, through which it may be bolted to the molding machine in the foundry. A longitudinal center line is scribed on the face and two pin holes are drilled at each end to locate the flasks. Either the flask itself or a suitable jig is employed to locate these holes on either side of the center line. One hole at each end is smaller than the other. Shouldered pins are inserted in the holes and fastened by nuts on the under side.

The larger hole at each end is a loose sliding fit for the cope pins. One set of pins guides the drag flask into place, and the other pins guide the copes. This is not an arbitrary arrangement, but may be varied to suit the position of the pins for any type flask. With possible slight variation due to pattern design, the following description applies to fitting up any patterns.

A wood master pattern is made and split in the usual manner. Only half patterns are cast in metal. Even where both halves of the pattern are symmetrical and interchangeable, usually it is just as easy to make a whole wood pattern split in halves as it is to make a half pattern. In the event a considerable number of metal patterns are wanted, as for instance where a considerable number may be grouped on a plate, two half wood patterns will expedite the job. The metal half patterns are molded carefully and poured from the one ladle to insure uniform contraction, and also to minimize the necessary finishing.

The half patterns are surfaced on the joint side, then matched in pairs and marked with a small prick punch or in any other suitable manner so that they may retain their identity through all the succeeding operations. Theoretically all the halves are alike, but usually minor points of difference develop. For that reason it is advi able to keep each originally marked pair together. The half patterns are sweated together and finished to the required dimensions. If convenient, all circular sections are finished in the lathe. Two, three or more small holes are drilled completely through both halves of the pattern to serve as dowel holes. The usual precautions are observed to drill these holes as nearly vertical as possible—in other words perpendicular to the parting plane.

The patterns once more are separated into halves and one set is placed in any desired position on one side of the center line on the plate. The corresponding halves are placed temporarily out of the way. Any number of patterns within the capacity of the flask may be treated. We shall assume that two are used. The distinctive feature of this method now is brought into play. A shallow metal frame accurately planed on both sides is guided into place on the plate by the pins which fit into corresponding holes drilled accurately on the center line. This frame corresponds in a general but not necessarily accurate manner to the length and half the width of the flask to be used in the foundry. Plugs, long enough to extend above the top of the frame, are inserted in the dowel holes in the pattern and then the frame is filled with plaster. Before the plaster is poured, the plate and patterns are painted with vaseline to prevent the plaster from sticking.

After the plaster has set, the dowel hole plugs are removed. The patterns are anchored firmly on the plate and while in that position a drill is employed to continue the dowel holes in the patterns into the iron plate. In this manner the future position of the patterns on the plate is assured. However, at this point they may not have served their full purpose. The guide pins are removed and the frame containing the patterns bedded in plaster is lifted, turned over and laid upon its back on the work bench. The complementary half of each pattern, recognizable through the identifying marks previously referred to, is located in place by inserting pieces of rod the proper diameter to form a tight fit through the upper and into the lower dowel holes in the pattern. Joint and patterns are painted with vaseline and then the second frame is set on in the same manner as any ordinary cope.

Frame Is Removed

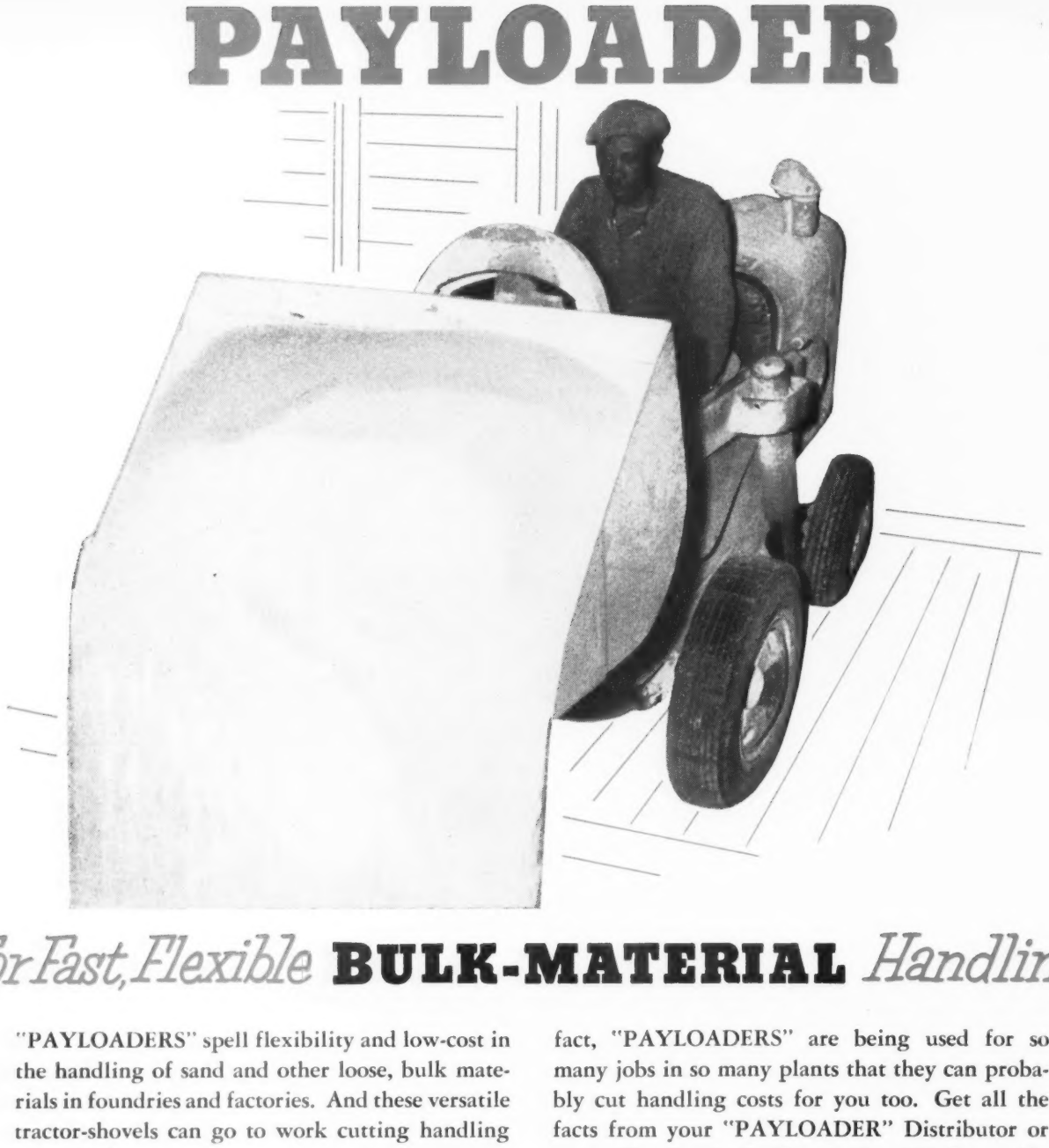
It is filled with plaster and after the plaster has set the frame containing the plaster and upper halves of the patterns is lifted off and placed face down on the right hand side of the cast iron pattern plate. The same pins employed in locating the first frame are employed to locate the second frame. The dowel pin rods are removed, and as in the first instance, a drill is employed to continue the holes in the patterns down into the cast iron plate.

The frame then is lifted off for the last time, turned over and laid on its back. The patterns are removed from the plaster and relocated on the plate by the dowel holes. Tight fitting pins are driven into the holes to attach the patterns to the plate. After the gates are attached and a few minor adjustments made, the job is ready to go into production.

After the frames have served their purpose, the plaster is knocked out and they are ready to be used again with another pattern or group of pat-

(*Continued on page* 257)

PAYLOADER



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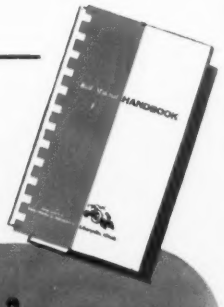

SAY "HUFF"

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(*Continued from page* 255)

terns. Of the many advantages of this method over the usual transfer methods, perhaps the feature connected with drilling the various holes will appeal most to those who want to mount patterns in this manner. With the familiar cast iron transfer plate, the most extreme accuracy in drilling the holes is essential to success. If every one is not absolutely perpendicular to the parting plane, trouble will be experienced in fitting the second halves of the patterns on the plate. Afterward the cope and drag halves of the mold will not match. With the plaster transfer, a fair degree of accuracy is desirable in drilling the holes, but at the same time a slight deviation will not affect the relative position of the patterns.

Instances arise where it may be necessary to arange four patterns, or four groups of patterns on one plate. Two lines are drawn at right angles across the center of the plate. One hole is drilled at the intersection, and a similar hole is drilled on each line at a point corresponding in a general way to the boundary line of the flask to be employed. Instead of using frames half the width of the plate as in the foregoing example, a pair of frames large enough to cover only one fourth of the plate are provided. Details of fitting the patterns, filling the frames with plaster, etc., are the same as already described.

Match Patterns on Two Plates—Flat one-side pattern plates may be prepared in several ways depending on the size and shape of the patterns and flasks, and to a certain extent on the manner in which the molds are to be made. Patterns and plates designed for use on power-operated machines usually are constructed more substantially than when the molds are to be rammed by hand on the bench or floor. In one method two perfectly flat plates, exactly the same shape and size, with the edges planed true and with the corners exactly rectangular, are laid side by side on a surface table and the upper surfaces chalked. Center lines and as many guide lines as may be considered necessary are scribed longitudinally and transversely on the surface of both plates.

Two holes are drilled at suitable points through each half pattern and then the patterns are laid on the plate and located accurately in the desired position by means of the center and guide lines. After they have been located the outline of each pattern is scribed on the plate and, in

(*Continued on page* 260)

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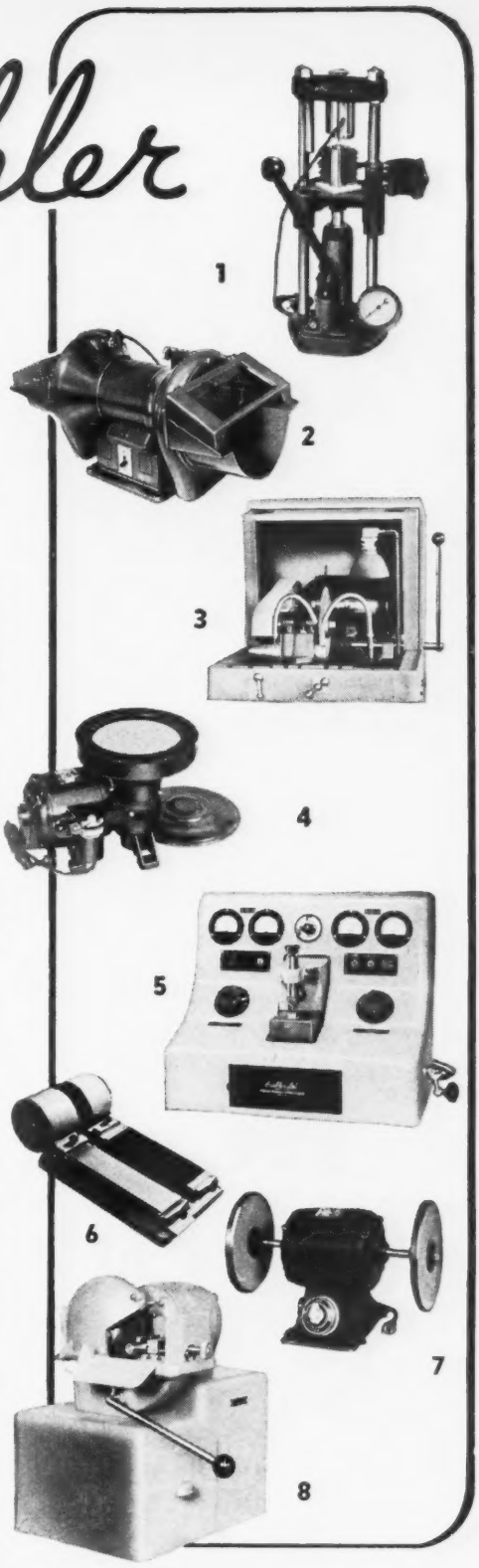

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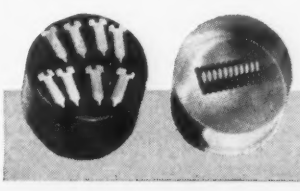

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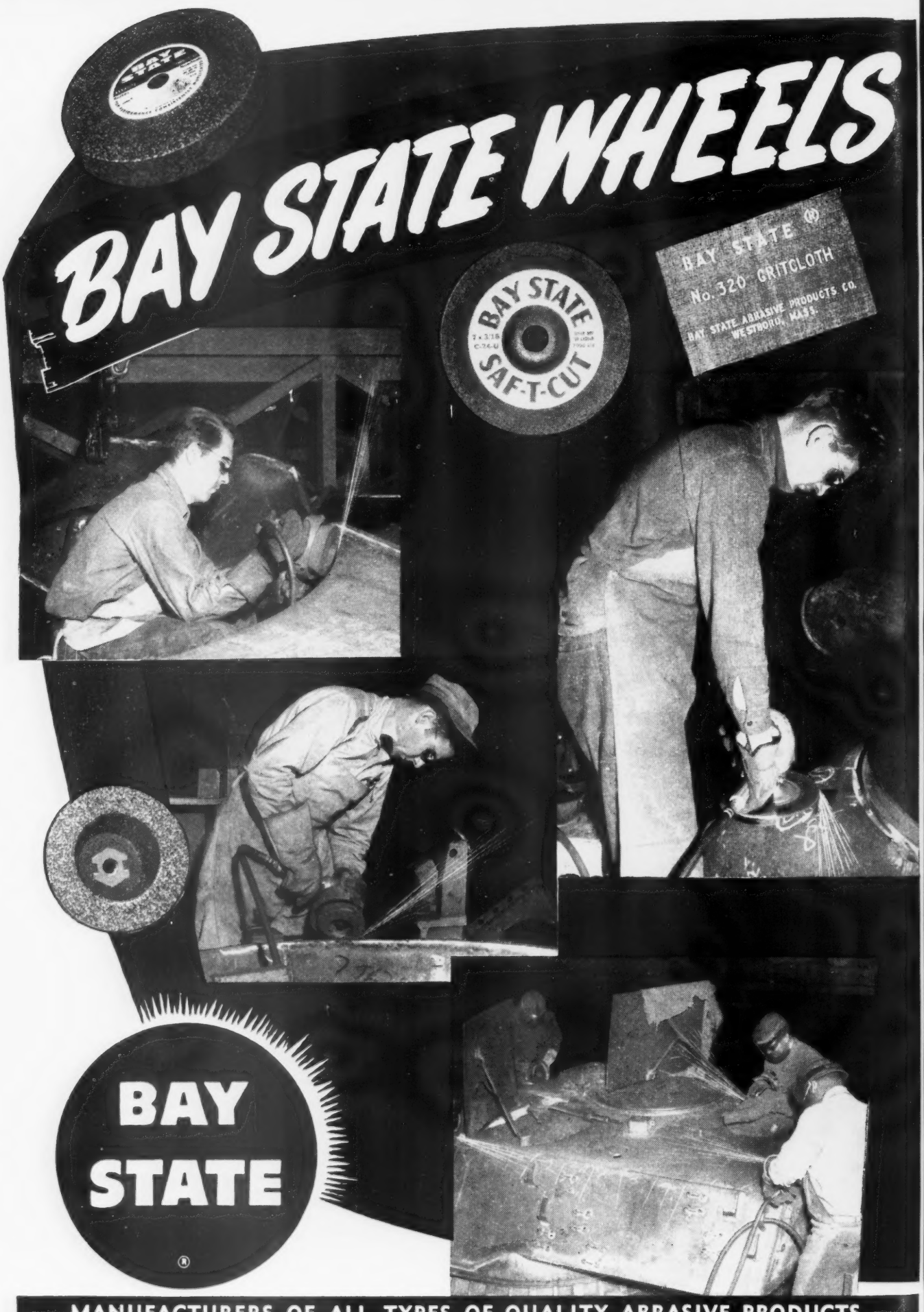
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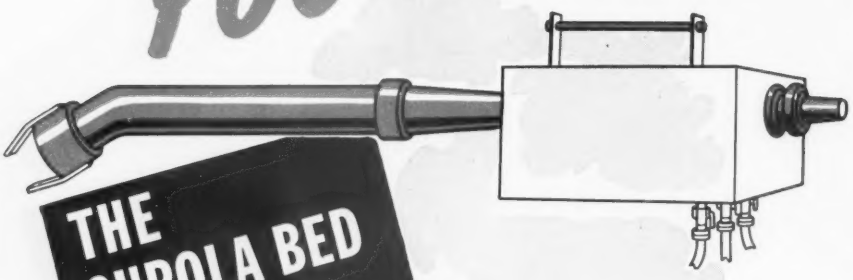

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(*Continued from page* 257)

addition, a small center punch mark is placed on each half pattern and a similar mark placed on a corresponding point on the plate. The patterns then are all laid to one side on the bench, after which each is taken in turn and clamped to the outlined position on the plate. A drill slightly smaller than the drill used in forming the holes in the patterns is employed to form a continuation of the holes into the plate.

After all the holes have been drilled and tapped the patterns are replaced on the plate and attached firmly by suitable screws provided with countersunk heads. It is unnecessary to add that the greatest care and accuracy must be observed in locating the patterns so that the two halves of the mold will coincide perfectly.

Another method which has been found of great assistance in securing accuracy consists in laying a sheet of fairly stiff paper on the first plate. Center and guide lines are laid out on the paper as in the first instance. After the patterns have been located on the paper, the outlines are cut through with a sharp knife. The paper is transferred to the second plate where it provides an accurate guide for setting the patterns on the second plate.

This method is particularly advantageous if the two halves of the pattern are right and left hand. It is readily apparent that if the paper is cut on the right hand plate and then turned upside down on the left hand plate, it will serve as an accurate guide in locating the patterns on the second plate. The holes are drilled and tapped in the manner outlined in the first instance.

Plaster for Iron Matchplates — Plaster is employed extensively to form molds for aluminum matchplates. The application of plaster of paris or other plaster compositions is limited to nonferrous alloys in which the pouring temperature is not over 2300°F for thin sections. If sections are heavy, the pouring temperature should not be over 2000° F. Chemical decomposition of the plaster at high temperature produces rough surface on the casting. Therefore plaster, while satisfactory for aluminum, is not a satisfactory material for casting gray iron matchplate castings. For high melting point alloys, the investment molding process is employed.

When trouble is experienced in producing clean, smooth and accurate gray iron matchplates in sand

(*Concluded on page* 262)

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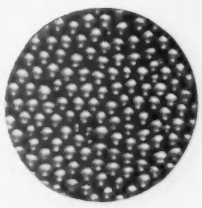

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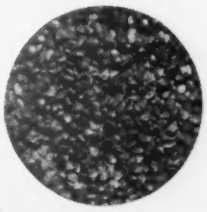

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(*Concluded from page* 260)

molds, a study of the sand may reveal the answer to the problem. A fine-grain sand containing seacoal in the proportion of 1 part seacoal to 12 parts sand, should serve satisfactorily, peel readily and leave a clean, smooth surface on the casting. As an added precaution for securing fine surface finish, blacking may be shaken from a bag over the mold face. The pattern is replaced in the drag impression and rapped down lightly, thus forcing the blacking more tightly into the mold face and insuring a smooth face on the casting.

Matchplate Thinner in Center — Sometimes a sand-cast aluminum matchplate comes out of the mold thinner in the center than in the remainder of the plate. When copes from this plate are placed on the drags they crush in the center. In a case of this kind several possibilities come to mind. The first possibility is that the cope has not sufficient bars to prevent the sand from sagging slightly in the central area. The sand must have support from bars or gaggers or both if a comparatively large area is involved. Where bars are present the sand may not be tucked around them to give the necessary support. Another cause, although not too probable, is the method of ramming whereby the central part is rammed properly, but the outer area is not. This permits the metal pressure to force the cope and drag faces of the mold a little further apart. The casting is strained or swelled. Other causes include not striking off level, having the mold high in the center, and the use of weights on the cope. If the weight bears down too heavily in the center it will force the cope face of the mold to approach the drag face and thus reduce the space to be occupied by the metal. Where the weight rests on the outside area of the cope top, but does not rest evenly over the center part, a probability exists that the metal pressure in the mold will push up the sand body in the center until it touches the weight. The result is a plate *thicker* in the center than in the outer part and a fin or flash at the joint line of the casting or castings in the center of the matchplate.

(*To be continued next month*)

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Bureau of Standards Issues 1952 Report

Summarizing scientific and engineering investigations conducted by the National Bureau of Standards during fiscal 1952, the *Annual Report 1952, National Bureau of Standards* contains accounts of current activities as well as more detailed descriptions of representative projects.

Major fields of activity include electricity, optics, and meteorology, heat and power, atomic and radiation physics, metallurgy, ordnance development and many others. Designated National Bureau of Standards Miscellaneous Publication 207, the report is available for 30 cents per copy from the Government Printing Office, Washington 25.

Offers Grinding Booklet

The Grinding Wheel Institute has published a booklet called "Cutting-off Wheels" that covers use and classification of wheels, machine and wheel speeds and mountings and such other subjects as techniques and handling of work. It was prepared by the safety committee of the institute, and free copies can be obtained from the Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15.

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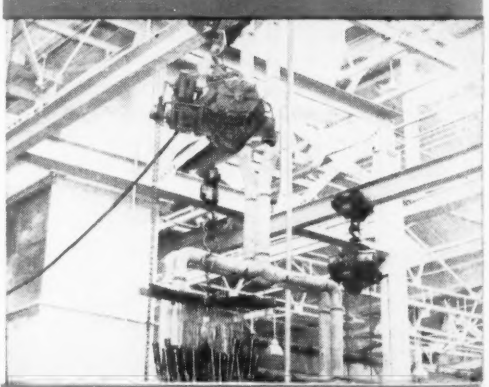
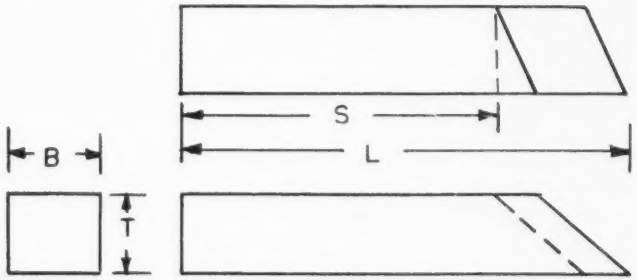


THOR HOISTS AND BALANCERS handle raising, lowering or suspension of work or equipment . . . your choice of 11 air hoists for loads from 500 to 6000 pounds . . . 36 balancers for loads to 300 pounds.

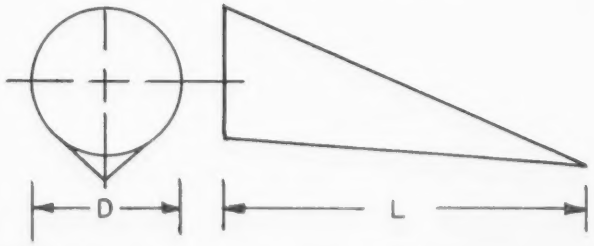
Formulas for Determining Weights of Castings

(Continued from August)



To find the weight of a truncated rectangular casting, multiply the thickness of the base by its breadth, by the sum of the longest and shortest lateral edges, by one-half of the weight per cubic inch of material used. (See C in Table I, page 149, July issue).

$$W = T\,B\,(S + L) \times \tfrac{1}{2}\ \text{Wt. per cu in.}$$



To find the weight of a cone, multiply the diameter squared by the length, by the constant, K, corresponding to the weight per cubic inch. (See Table VI).

$$W = D^2LK$$

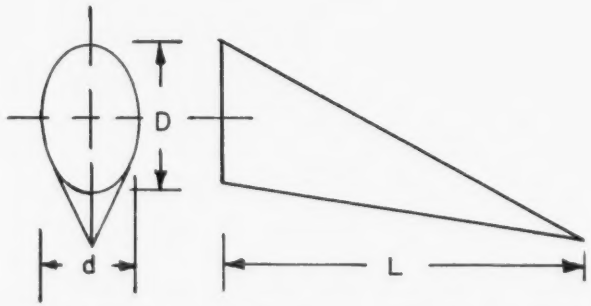
Table VI

Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K
.096	.0251	.170	.0445	.250	.0655	.330	.0864	.410	.1073	.490	.1283
.100	.0261	.180	.0471	.260	.0681	.340	.0890	.420	.1100	.500	.1309
.110	.0288	.190	.0498	.270	.0707	.350	.0916	.430	.1126	.510	.1335
.120	.0314	.200	.0524	.280	.0733	.360	.0943	.440	.1152	.520	.1361
.130	.0340	.210	.0550	.290	.0759	.370	.0969	.450	.1178	.530	.1388
.140	.0367	.220	.0576	.300	.0785	.380	.0995	.460	.1204	.540	.1414
.150	.0393	.230	.0602	.310	.0812	.390	.1021	.470	.1231	.550	.1440
.160	.0419	.240	.0628	.320	.0838	.400	.1047	.480	.1257	.560	.1466

Interpolation Table

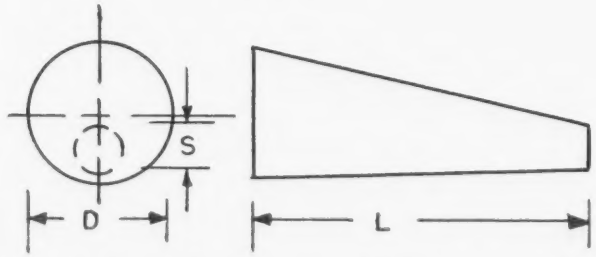
Add'l wt.	Add'l K	Add'l wt.	Add'l K	Add'l wt.	Add'l K
.001	.0003	.004	.0010	.007	.0018
.002	.0005	.005	.0013	.008	.0021
.003	.0003	.006	.0016	.009	.0024

For method of interpolation see Table II, page 150, July issue.



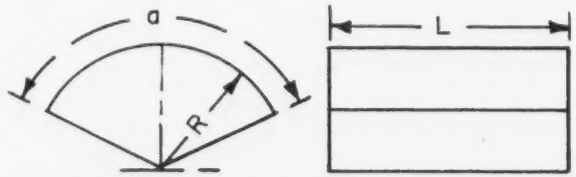
To find the weight of an elliptical cone, multiply the large diameter of the base by the small diameter, by the length, by the value of K. (Table VI).

$$W = DdLK$$

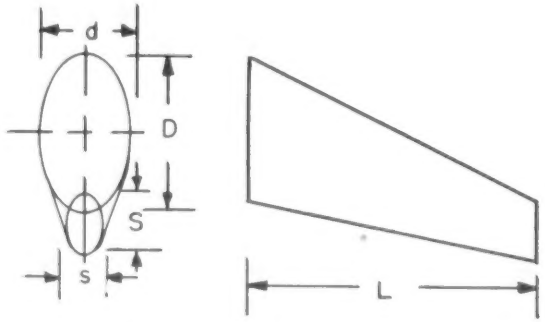


To find the weight of a frustrum of a circular cone, multiply the sum of the diameter of the large base squared, the diameter of the small base squared and the product of the two diameters by the length, by the value of K. (Table VI).

$$W = (D^2 + S^2 + DS)LK$$



To find the weight of a sector of a solid cylinder, multiply the radius squared by the length, by the number of degrees in the angle, by the constant, M, whose value is indicated in Table VII.



To find the weight of a frustrum of an elliptical cone, first find the sum of the products of the large diameter of large base by its small diameter, the large diameter of the small base by its small diameter and the large diameter of the large base by the small diameter of the small base; then the required weight is the product of this sum by the length by the value of K. (Table VI).

$$W = (Dd + Ss + Ds)LK$$

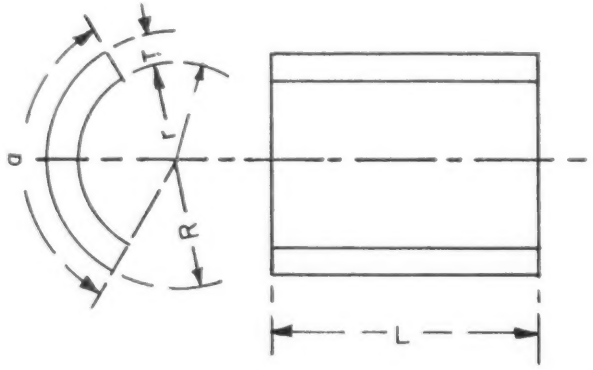


Fig. 22

To find the weight of a sector of a hollow cylinder, multiply the sum of the inside radius and one-half of the thickness by the thickness, by the length, by the number of degrees in the angle, by the constant, m, corresponding to the weight per cubic inch. (See Table VII).

$$W = (r + T/2)\ T\ L\ a\ m$$

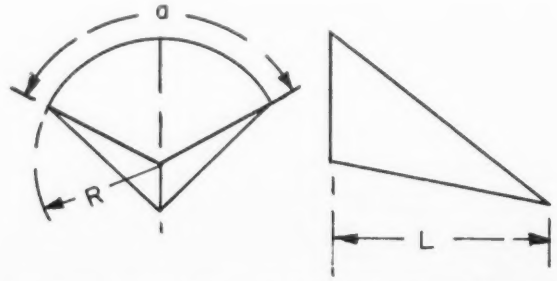
Table VII

Wt. per cu. in.	M	m	C	Wt. per cu. in.	M	m	C	Wt. per cu. in.	M	m	C
.036	.00084	.00168	.000279	.250	.00218	.00436	.000727	.410	.00358	.00716	.001193
.100	.00087	.00175	.000291	.260	.00227	.00454	.000756	.420	.00367	.00733	.001222
.110	.00096	.00192	.000319	.270	.00236	.00471	.000785	.430	.00375	.00750	.001251
.120	.00105	.00209	.000349	.280	.00244	.00489	.000815	.440	.00384	.00768	.001280
.130	.00113	.00227	.000378	.290	.00253	.00506	.000844	.450	.00393	.00785	.001300
.140	.00122	.00244	.000407	.300	.00262	.00524	.000873	.460	.00401	.00803	.001338
.150	.00131	.00262	.000436	.310	.00271	.00541	.000902	.470	.00410	.00820	.001367
.160	.00140	.00279	.000465	.320	.00279	.00558	.000931	.480	.00419	.00838	.001396
.170	.00148	.00297	.000495	.330	.00283	.00576	.000960	.490	.00428	.00855	.001425
.180	.00157	.00314	.000524	.340	.00297	.00593	.000989	.500	.00436	.00873	.001455
.190	.00166	.00332	.000553	.350	.00305	.00611	.001018	.510	.00445	.00890	.001484
.200	.00175	.00349	.000582	.360	.00314	.00628	.001047	.520	.00454	.00908	.001513
.210	.00183	.00367	.000611	.370	.00323	.00646	.001076	.530	.00463	.00925	.001542
.220	.00192	.00384	.000640	.380	.00332	.00663	.001105	.540	.00471	.00942	.001571
.230	.00201	.00401	.000669	.390	.00340	.00681	.001135	.550	.00480	.00961	.001600
.240	.00209	.00419	.000698	.400	.00349	.00698	.001164	.560	.00483	.00978	.001629

Interpolation Table

Add'l wt.	Add'l M	Add'l m	Add'l C	Add'l wt.	Add'l M	Add'l m	Add'l C	Add'l wt.	Add'l M	Add'l m	Add'l C
.001	.00001	.00002	.000003	.004	.00003	.00007	.000012	.007	.00006	.00012	.000020
.002	.00002	.00003	.000006	.005	.00004	.00009	.000015	.008	.00007	.00014	.000023
.003	.00003	.00005	.000009	.006	.00005	.00010	.000017	.009	.00008	.00016	.000026

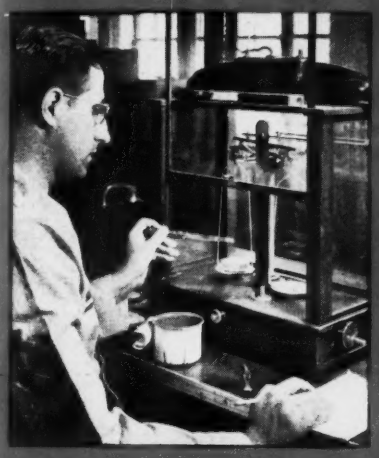
For method of interpolation, see Table II, page 150, July issue.



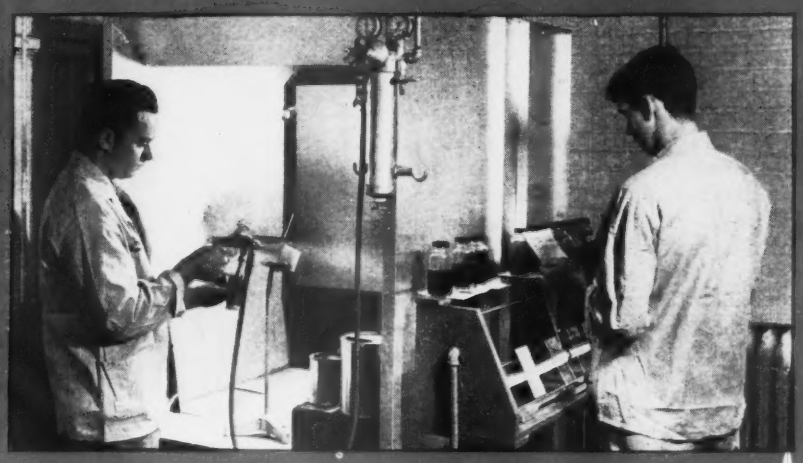
To find the weight of a sector of a cone multiply the radius squared by the length by the number of degrees in the angle by the value of C. (Table VII).

$$W = R^2 L\ a\ C$$

(To Be Continued)



TOUSEY solves finishing problems



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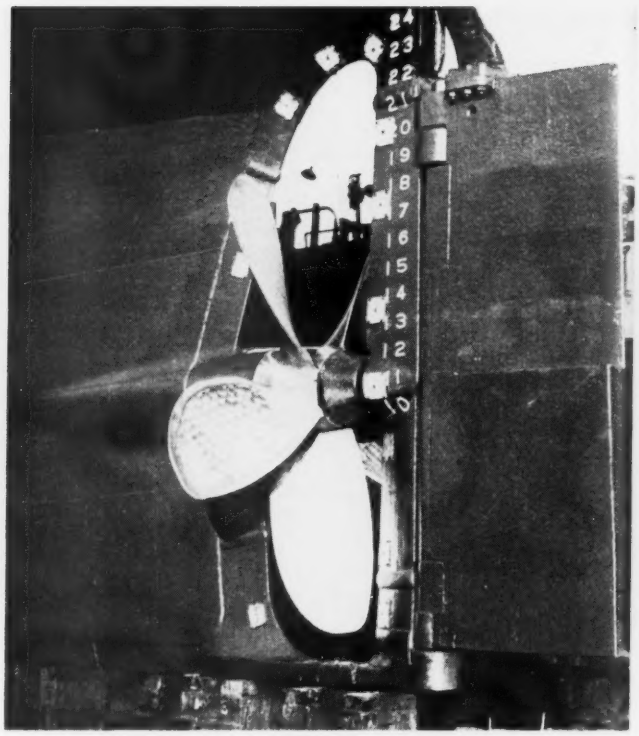
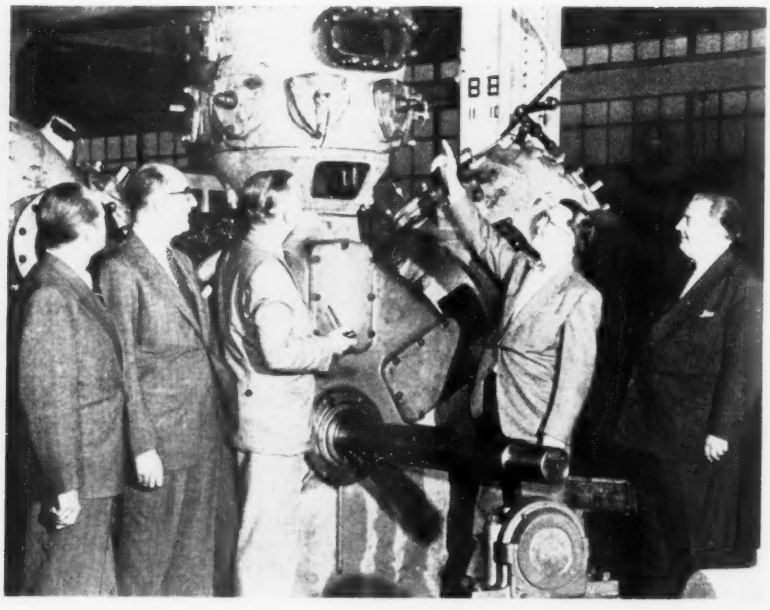
News Views

STEEL GIANT: Claimed to be the largest steel casting ever poured in Canada, this 90-ton steel giant was produced by Dominion Foundries & Steel Ltd., Hamilton, Ont., as one of the two housings for its new hot mill. As it is shown here, ready for shipping to Dominion Engineering Works Ltd., Montreal, where the mechanical part of the new mill is being manufactured, the casting is 5 ft high, 11 ft and 10 in. wide and 24 ft and 4 in. long. About 150 tons of metal was poured in its production, and making the mold required 6 weeks. Cooled in the mold for 8 days, the casting was annealed for 4 days



NEW ALLOY: Cast of a new alloy of copper, nickel, aluminum and other elements and installed on the *U. S. American Clipper* of the United States Lines, this solid, five-bladed cargo ship propeller is said to possess superior cavitation and erosion resistance and to be 20 per cent lighter than the four-bladed propeller ordinarily installed on vessels of this class. It was cast in the Eddystone, Pa., foundry of Baldwin-Lima-Hamilton Corp., which developed the alloy—called Nialite—with the assistance of the International Nickel Co., New York

ALUMINUM CASTINGS: President John P. Mansfield of the Plymouth Division, Chrysler Corp., holds cast aluminum combined torque converter and clutch housings used in Plymouth's new no-shift drive. Use of aluminum is said to permit more efficient design, to simplify machining and to improve performance



ON TOUR: In recognition of its 100th year in export trade, Worthington Corp. recently conducted an international sales conference. In this scene, H. M. Boteler of the company's Buffalo Works is explaining features of an air compressor to four executives of Worthington's overseas affiliated companies during a tour of the Buffalo plant. Left to right are A. Huber, Austria; J. Maldonado, Spain; C. J. Andriessen, Netherlands; Mr. Boteler; and E. Sell, West Germany

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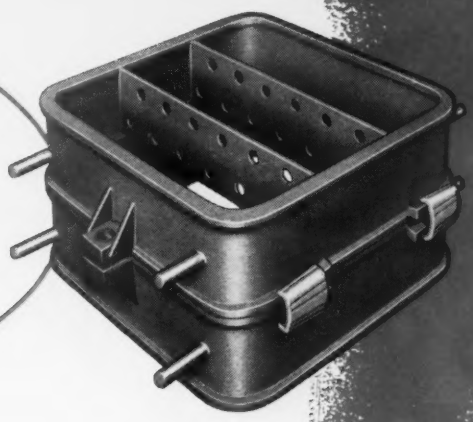

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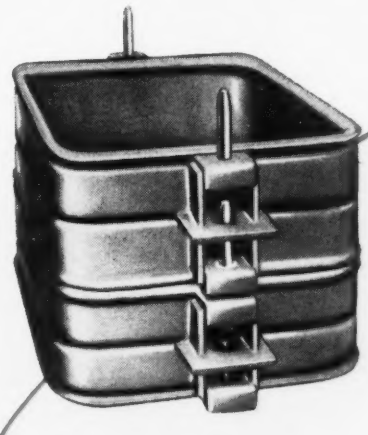

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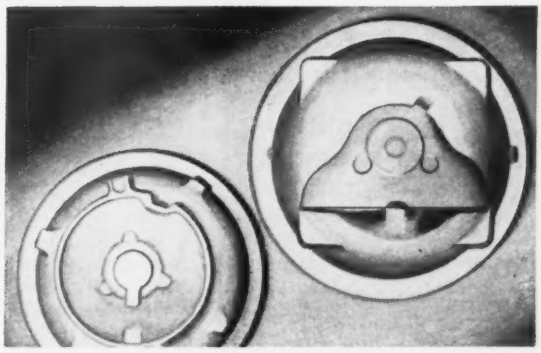

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Issue Revision of JIC Electrical Standards

The Joint Industry Conferences Electrical Standards for Industrial Equipment were revised at the JIC conferences Mar. 18-20, at the Rackham Engineering Building, Detroit. The revision covers three years of progress made by machine tool builders and users of industrial equipment. Published by General Motors Corp. for distribution to its divisions and to manufacturers who supply these divisions, copies of the standards are available from GM Production Engineering Section, General Motors Building, Detroit 2.

The standards were formulated by representatives of the Industrial Electrical Engineering Society of Detroit; Industrial Equipment Users; Industrial Furnace Manufacturers Association Inc.; National Electrical Manufacturers Association; National Machine Tool Builders' Association and Resistance Welder Manufacturers Association. The standards are designed to assist suppliers and users to improve operating performances.

Steel Piping Materials

Comprising the December, 1952 edition of *ASTM Specifications for Steel Piping Materials,* this publication sponsored by Committee A-1 on Steel of the society, contains 56 widely used specifications for carbon-steel and alloy-steel pipe and tubing, including stainless as well as castings, forgings and welding fittings, bolts and nuts used in piping and related installations. Copies of the 394-page publication may be secured from American Society for Testing Materials, 1916 Race St., Philadelphia 3, for $3.75.

Book Review

Proceedings, Vol. 52, 1952, of the American Society for Testing Materials, cloth, 1309 pages, 6 x 9 in. Published by American Society for Testing Materials, 1916 Race St., Philadelphia 3.

Contains summary of proceedings of the fifty-fifth (1952) annual meeting of the society, president's address, annual report of the board of directors as well as reports of the numerous committees of the society. In addition it contains all the technical papers and discussions presented at the meeting. The Edgar Marburg lecture by R. C. McMaster on "Nondestructive Testing", and the Gillett Memorial lecture by N. L. Mochel on "Man, Metal and Power" also are included.

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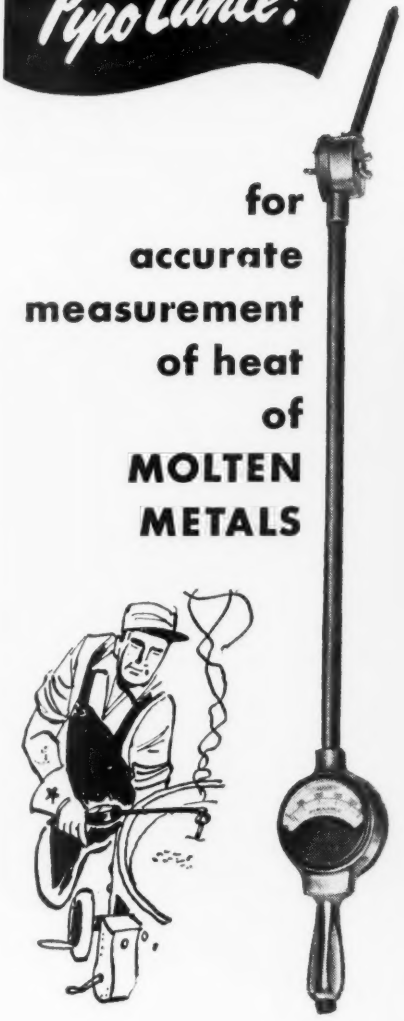

For quick, accurate temperature readings of molten metals, operators of non-ferrous foundries everywhere are relying on the Alnor Pyro Lance. Portable, handy to use, the Pyro Lance has a protected thermocouple, with adjustable angle head, mounted in the lance tip. It takes temperature below the surface —unaffected by dross or other conditions. Here's an easily handled instrument to help control quality in the foundry. For complete information and prices on this valuable instrument write for Bulletin No. 1724-D. Illinois Testing Laboratories, Inc., Room 511, 420 N. LaSalle St., Chicago 10, Illinois.

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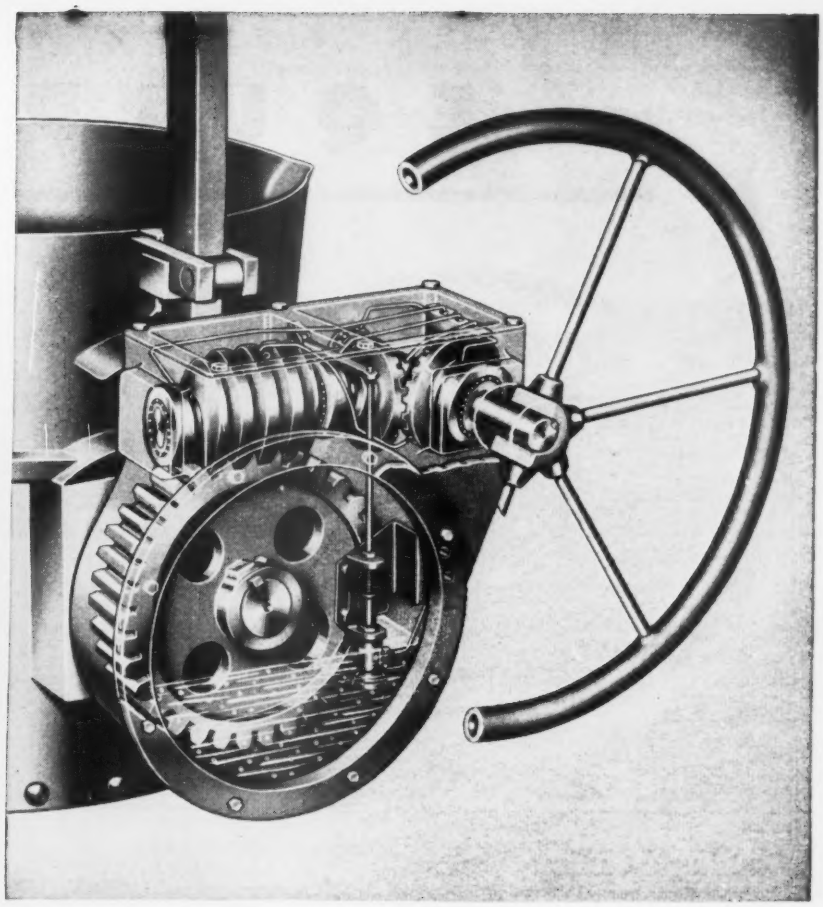

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Take a close look at the phantom view. Here is a one-piece, self-contained unit with all parts easily accessible. Your maintenance man can quickly make back-lash adjustments to pin-point accuracy and positive adjustment by adjusting the bearing lock nuts on all gears and worm. These nuts are easily reached and with working space to spare.

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There is no connection between the bail and the gearing. No clearance for heat distortion is necessary, permitting an assembly almost to machine tool precision.

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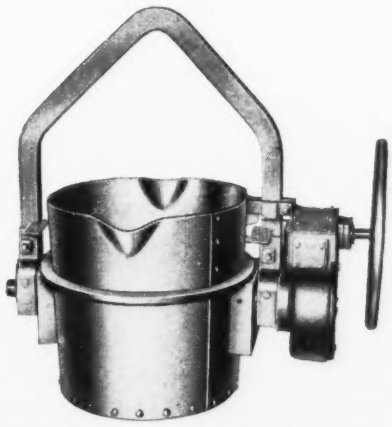

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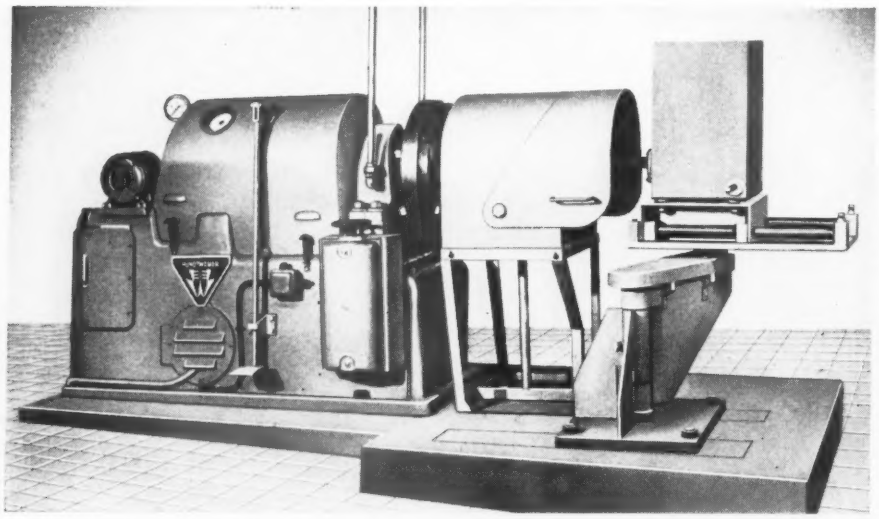
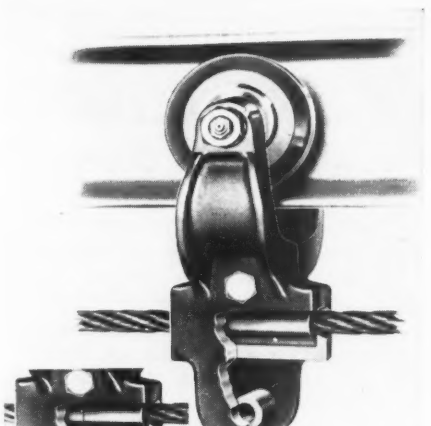


Centrifugal Casting: Ryke's Technical Trading Co., 271 Heemsteedse Dreef, Heemstede, Holland—Horizontal centrifugal casting machines are supplied with equipment to reduce time lost when mold sizes are changed. Molds assertedly can be changed within 15 minutes. Base is cast in one precision machined, internally ribbed piece. Steel shaft is driven by triple V-belts from the motor enclosed in the base, and sheaves in two steps provide for 0 to 2200 rpm speed range. Shaft runs in ball and roller bearings. Rheostat in rotor circuit of the slipring type motor regulates speed. Pieces are ejected hydraulically by pushbutton ejector. Unit is provided with a combined guard and cooling installation. Vertical machines are erected below floor level and operated from a remote control box. Pouring is done from above, through a funnel. Dripproof, cast steel housing encloses all moving parts. Special bearings, a hardened and balanced shaft and a geared transmission are features of the unit. The slipring type driving motor is regulated in its rotor circuit by a rheostat which permits continuous speed regulation up to the maximum. Three types of horizontal machines spin components from 2 to 22 in. OD and from 2 to 52 in. long. Vertical machines come in four types, for pieces from 4 to 40 in. OD and 24 to 50 in. long. Manufacturers are Hundt & Weber. Rykes is the world distributor.

For More Details Circle No. 1—Page 278



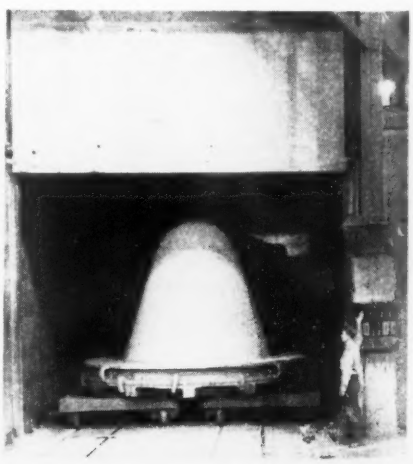
Cable Conveyor: E. W. Buschman Co., Clifton Ave., Cincinnati 32—Swaged bushings on overhead trolley conveyors lock trolleys on immovable centers and are said to make splicing cable easy. A two-piece trolley bolts over the cylindrical bushing, which is permanently locked to preformed cable on accurate centers by high pressure swaging. At splices, the bushing on the end of each cable is half-length, the trolley completing the splice. Cable equipped with new trolley is interchangeable with the firm's existing overhead, snub-lock trolley equipment. Other conveyor features include the use of 7000-lb, ¼-in. diam and 14,000-lb, ⅜-in. diam preformed 7 x 19 special aircraft cable with both sizes operating on standard turns and drives; improved funnel-shaped contacts at cable and trolley; and automatic greasing and oiling of lock and trolley wheels. Load capacity of each trolley is 80 lb with standard wheels and 160 lb with double duty wheels at nominal ratings, using service factors. Variable speed drives are available with 250, 500, 750 and 1000-lb capacities which pull loads totaling up to 30 times these figures.

For More Details Circle No. 2—Page 278

Grinders: Buckeye Tools Corp., Division 20, P. O. Box 966, Dayton 1, O.—Two general-purpose grinders, adaptable to die grinding and to use with rotary files, cutters and midget mills, have been added to the firm's line of portable air tools. Available with lock button or lever throttle, these spindle grinders take 2-in wheels and are offered with extension adapters for using mounted wheels. They weigh only 1¾ lb. The two tools feature one-piece shaft design, which eliminates replacement of expensive parts when wear occurs. The rotor "floats" on the shaft, connected by two keys which can be replaced quickly and easily when they have worn.

For More Details Circle No. 3—Page 278

Car Type Mold Ovens: Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15—Car type mold drying oven has a capacity of 100 tons per bake and is operated at 600-800°F using combination gas-oil burner. Conventional side ducts at floor level have been eliminated in order to avoid damaged ducts and to reduce maintenance costs. Heat circulates down toward the center of the oven bot-



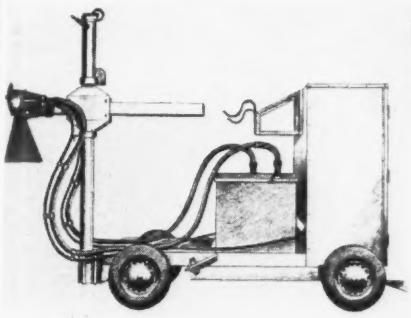
UPPLIES

For More Details on these Items Use Reply Card — Page 278

tom so that temperature and drying are uniform. High air volume and recirculation make this feature practical. The car puller which moves cars in and out of the oven is push-button controlled. Oven is 15 ft high, 18 ft wide and 32 ft deep. It is equipped with a motor operated, pushbutton controlled lift door at one end.

For More Details Circle No. 4—Page 278

Mobile X-Ray: Westinghouse Electric Corp., Section X, 2519 Wilkens Ave., Baltimore 3—Mobile 250-kv x-ray unit for photographing unwieldy objects that require positive x-ray inspection offers improvements



in flexibility and ease of handling. Operator has been given additional protection so that he can stand inside the cab, radius of turn has been improved so that the unit can be positioned more easily, chassis has been strengthened, and the center of gravity has been lowered. Wide inspection coverage is accomplished with a long, vertical column and a horizontal tubearm. Minimum tubehead-to-floor distance is 36 in. Maximum is 108 in. Throughout this 72-in. vertical travel, the tubehead has a horizontal travel of 48 in. The vertical column can be rotated 360 degrees. A 250-kv constant potential transformer provides power for radiographing up to 4½ in. of steel and proportionally thicker sections of lighter density materials.

For More Details Circle No. 5—Page 278

Air Hose: B. F. Goodrich Co., Akron, O.—Heavy duty air hose suitable for working pressures up to 400 psi is reinforced with a single braid of high tensile steel wire and is said to be very flexible. It is designed for rugged service where high working pressures are required or where the hose cover is subjected to severe abrasion. An oil-resistant hose tube permits tools to be oiled through the hose. A light gray, oil resistant cover increases visibility of the hose, which is manufactured in ½, ¾ and 1-in. sizes.

For More Details Circle No. 6—Page 278

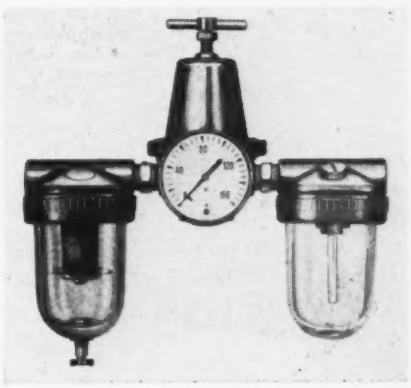
Aerial Grinder: Mall Tool Co., 7725 South Chicago Ave., Chicago 19—Aerial grinder available in three sizes is designed for use on industrial workbenches, in foundries and for other applications. Features include aluminum alloy housing, use of ball bearings throughout the tool and fully enclosed commutator and switch. The 4 x 1, 5 x 1 and 6 x 1-in. wheels have, respectively, ½, ½ and ⅝-in. holes and 5560, 4430 and 3730-rpm spindle speeds. The grinder weighs 12 lb and is 4½ x 4¾ x 22 in.

For More Details Circle No. 7—Page 278

Slag-Hole Block: Electro Refractories & Abrasives Corp., 344 Delaware Ave., Buffalo 2—Slag-hole block for use in cupolas utilizes a new ceramic bond that assertedly lengthens the life of blocks under certain severe conditions. Manufacturer reports that the bond makes the silicon carbide block more refractory and more resistant to corrosion. It is especially intended for use where continuous pouring operations are employed.

For More Details Circle No. 8—Page 278

Lubricator: Arrow Tools Inc., 1900 South Kostner Ave., Chicago 23—Filter-regulator-lubricator unit features a porous, bronze element with the ability to retain a great amount of sediment on its outer surface without a serious loss of pressure. Air or

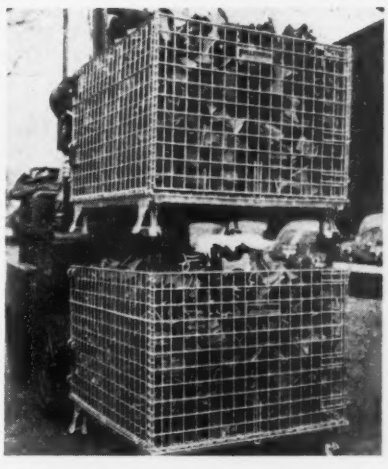


filtrate enters the unit where centrifugal action throws moisture and heavier solids against the bowl and downward into a relatively quiet zone below the baffle, where it is deposited. Remaining air or filtrate

Materials Handling Boxes Feature Versatility

NEW model in the company's line of handling units for production, shipping and storage operations provides extra capacity for bulky materials through elimination from the undercarriage of center legs and leg braces. Loads can be heaped well above the top rod. Malleable steel corner legs and new frame design of interlocked U-channel beams assure rigidity and solidity in stacking.

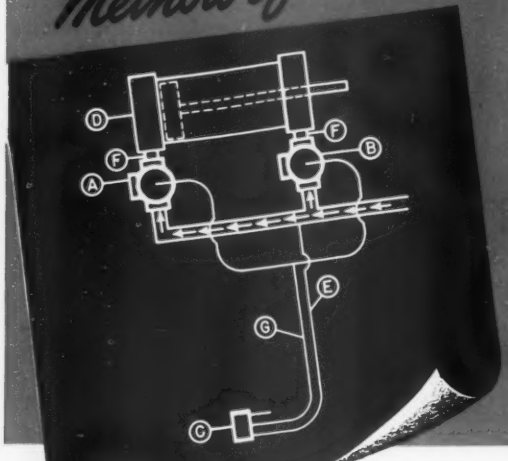
Like other units in the line, this one features electrowelded, reinforced, steel rod construction with eight-way entry for fork trucks. To save freight on return trips, the unit folds when empty to one-fifth its normal space. It is available in 2000, 4000 and 6000-lb capacities. The container is manufactured by the Union Steel Products Co., Albion, Mich.



For More Details Circle No. 9—Page 278

IF IT'S A VALVE FOR FOUNDRY WORK— ROSS HAS IT

How to Boost Production with new Method of Mounting Ross Valves



★ Faster Machine Speeds

★ Less Air Consumption

★ Economical Installation

★ Easier Operation

Close-coupling of valve to cylinder! That's the story behind the remarkable success of the *new Ross In-Line Master Valve.*

Users claim several important advantages. By placing the master valves (A & B) at the cylinder (D), air supply and exhaust are speeded up appreciably. This in turn permits faster movement of the cylinder piston and materially increases production.

At the same time, the close coupling means that two lengths of large diameter piping between valve and cylinder—pipes continually filled and exhausted with non-productive air—are replaced by two short connecting pipes (F). The resultant saving in air with every movement of the piston considerably reduces operating costs.

Operation is by a small, conveniently located 3-way pilot valve (C). It is supplied through tubing (E) and connected to the master valves by tubing (G). It may be mechanically, manually or electrically controlled. Hand or foot operation is greatly facilitated by the use of the smaller, more easily actuated pilot model.

The complete story of possible advantages in *your* production will be gladly furnished without obligation. Ask for Bulletin No. 302.

Ask Ross for Any Air Control Information

Ross makes valves only – hundreds of types and sizes. Take advantage of the experience gained in over a quarter century of concentration on control and application of air power!

ROSS OPERATING VALVE COMPANY

ROSS Air Control VALVES

107 E. GOLDEN GATE AVE., DETROIT 3, MICHIGAN

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then goes through the bronze element. Amount of deposit can be observed through the transparent bowl and removed through the drain cock at the bottom. The element can be taken out and cleaned with a blast of air. The lubricator is designed to deliver into the air stream a finely vaporized mist of oil that remains in suspension and provides positive lubrication to working parts of air-operated equipment. The complete unit is obtainable in ⅜, ½, ¾ and 1 in. sizes. Various combinations in these sizes may be used if complete unit is not required.

For More Details Circle No. 10—Page 278

Hydraulic Loader: Baker-Lull Corp., Dept. KP, 314 West 90th St., Minneapolis 20 — Hydraulic loader available with eight accessory attachments is designed to speed bulk

materials handling. Said to have unusually good lifting power and low cost per pound, it is available in six models rated by capacity, dumping height and reach and is mounted on Case, Minneapolis-Moline, Sheppard or Oliver industrial tractors. The loader is equipped with double acting hydraulic cylinders for precision control of loads in any direction and has forward reach ahead of the radiator of from 66 to 72 in. It is engineered to crowd and dig below the tractor level. Basic attachment is a material bucket for materials loading and unloading. Others available include combination coal and snow bucket, bulldozer, lifting crane, sweeper, rear leveling blade and logging fork.

For More Details Circle No. 11—Page 278

Respirator: Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8—Respirator with single cartridge that contains treated charcoal is designed to protect the wearer against nuisance concentrations of organic vapors and against certain acid gases having ob-

(*Continued on page* 279)

HELPFUL IDEAS FOR FOUNDRYMEN

AVAILABLE FOR THE ASKING—This reader-service is designed to provide foundrymen with "Idea" and reference material. Listings are selected from company product literature and reprints of special FOUNDRY editorial articles.

51. Silicone Lube Insulation

Dow Corning Corp.—If you haven't heard about Dow Corning 44 silicone lubricant for use in motor bearings, now is the time to get acquainted through 4-page technical data folder "Silicone Notes." You'll also be sent another 4-page folder describing silicone class H insulations for electrical equipment.

52. Conveyor Systems

Allied Steel & Conveyors, Inc. — "From beginning to end" is the phrase keynoted in 8-page brochure which describes how Allied will design, fabricate, erect or re-arrange complete overhead or roller conveyor systems in your plant. Typical examples of various conveyor types for diversified applications are shown together with an automatic salvage system.

53. Warm Air Furnaces

Jackson & Church Co.—Data on forced warm air furnaces for industrial heating and ventilation with tempered air is offered in 4-page folder 5c/Ja. Inputs range from 4,750,000 down to 50,000 Btu.

54. Loading Truck

Contractors Machinery Co. announces "an even better LA-40 Loadster" in bulletin L-403. New features—shorter overall length and self-positioning bucket. So get off yours and send for this piece. It has full specifications.

55. Colloidal Graphite

Acheson Colloids Corp.—If parting is a not-so-sweet sorrow between your castings and the molds in which they are made, they probably need Dag colloidal graphite. 6-page bulletin 425 describes this parting compound, and tells how to apply it in cavities, gates, runners and risers and to cores where rapid chilling is desired.

56. Rocking Electric Furnace

Kuhlman Electric Co., Detroit Electric Furnace Div.—The old rocking chair principle isn't dead yet, not even in the foundry. Four-page bulletin 505 describes performance of base-mounted electrode models of the Detroit rocking electric furnace. Rocking advantages are that electrodes remain clear of molten bath, and bath is stirred constantly.

57. Story of a Foundry

"Better Methods," published by Beardsley & Piper Div. of Pettibone Mulliken Corp., features an interesting and informative story about St. Marys Foundry Co. entitled "Production and Quality Control in a Machine Tool Jobbing Foundry." How this foundry was planned for the future is related. Data sheet on the Speedmullor supplements the issue.

58. Air Cylinders, Valves

S-P Mfg. Corp.—There's a size and type of S-P air cylinder for any application, according to 14-page well illustrated catalog No. 102 describing these cylinders, valves and accessories. Detailed cutaway drawings, tabulated dimensions and other data are featured. S-P stand for Speed and Performance.

59. Foundry Ovens

Michigan Oven Co.—Roller drawer, car and rack and conveyor core ovens are subject of 4-page illustrated bulletin 1152. Features are described, including horizontal air recirculation principle.

60. Coated Abrasives

Mid-West Abrasive Co.—60-page illustrated catalog and price list No. 26 gives all info on a comprehensive list of products. Information is well organized and calculated to keep the nose of the abrasives buyer off the grindstone.

61. Marking Sticks

Markal Co.—You don't have to take pains to mark your materials with Paintsticks described on illustrated data sheet. Thirteen types in many colors are for hot and cold marking of anything from ingots to iceboxes.

62. Chipping Tools

Arrow Tools, Inc.—Chipping hammer tools of various standard stock point styles are featured in 4-page illustrated bulletin and data sheet. For maximum strength, both hex and round shanks are completely machined.

63. Welding Machines

A. O. Smith Corp., Welding Products Div.—Snappy descriptions in 4-page bulletin on line of ac and dc welding machines offering a choice of capacities between 25 and 500 amp are brief, but give both facts and features.

64. Core Mudding Compound

Whitehead Brothers Co. — Ready mixed core mudding compound Dob-It, is a useful aid in core assembly. Two-page folder lists advantages and features in check-off form.

Additional Information?

For additional information on any of the items described under "New Equipment and Supplies," "Trade Publications" or "Ideas for Foundrymen" in this issue—simply circle corresponding item numbers on accompanying cards

Helpful IDEAS

65. Shell Molding Machines

Sutter Products Co. — Automatic shell molding machines designed to accommodate 95 per cent of the applications for shell molding without special engineering are described in 4-page illustrated bulletin S. Machines also feature adjustable coating and curing times.

66. Soldering Fluxes

Lake Chemical Co.—La-Co soldering fluxes for a variety of purposes in stick, paste and liquid form are featured in 6-page illustrated folder. Included are grades for stainless steel and silver soldering and other self-cleaning nonacid types. Uses and application photos are shown.

67. Polishing Cloth & Abrasives

Buehler Ltd.—Above is title of a 20-page booklet about polishing and abrasive cloths and papers for use in the preparation of metallurgical specimens. A swatch of each of the many grades described is inserted in the booklet, which also contains helpful suggestions for the metallurgical man.

68. Heat-Treating Furnace

Holcraft & Co.—A batch-type controlled atmosphere heat-treating furnace is described and illustrated in 4-page catalog. Available temperatures range from 400 to 1700° F, operating cycle is completely automatic and quench temperature and agitation are controlled.

69. Construction Service

Commercial Contracting Corp. — 24-page well-illustrated booklet tells story of company's contract service for constructing and demolishing industrial buildings and for moving and installing machinery. The various aspects are thoroughly covered, showing how various functions are integrated to transform your print to your plant.

70. Zipper Conveyor Belts

Stephens-Adamson Mfg. Co. — Handling materials gently and without spillage, breakage or contamination, Zipper closed belt type conveyor/elevators are described and illustrated in 16-page bulletin 349. Many drawings and photographs show construction, possible arrangements and installations.

71. Air Tools

Reed Roller Bit Co., Cleco Div.— If you've got air and want to run tools with it, get 78-page illustrated catalog on Celeco air tools and Dallett tools and accessories. In it are drills, screw and nut runners, grinders, chippers, scalers, sand rammers, etc., etc. Applications and specs are covered.

72. Electric Heaters

Edwin L. Wiegand Co.—Chromalox News No. 49 is a 4-page bulletin devoted to applications of electric heat in industry. Described and illustrated are infrared ovens, plastics molders, metals heat treating equipment and heaters for diesel engines.

73. Heat Treating

Carl-Mayer Corp. — 6-page folder HT-53 illustrates and describes car bottom, batch, conveyor pit and special types of heat treating ovens and furnaces. Mounting and installation drawings and photos are shown. Furnaces are suitable for service up to 2000° F.

74. The Sand Control Mystery

Claud S. Gordon Co.—Written not by Erle Stanley Gardner but H. L. Campbell, a foundry practice consultant, this 32-page illustrated booklet "Taking the Mystery Out of Sand Control" is valuable and interesting. Many aspects of the problem are covered in detail. Get this one!

75. Cereal Replacement

Masonite Corp., Chemical Div. — Not intended as an alternate for your favorite breakfast food, Mascon, a cereal replacement in foundry molding sands is discussed technically in an 8-page bulletin CD-15. Properties, methods of use, effect on sand properties, formulations, etc., are covered.

76. A Sling Song

Macwhyte Co.—If you're slingin' it, and if you handle heavy materials overhead, you must be, you should "hook on" to this 4-page illustrated bulletin 5308 which outlines Atlas round-braided, Drew flat-braided and Monarch single-part slings. Various types are shown and ratings are given.

77. Electric Crane Equipment

Harnischfeger Corp. — Alternating and direct current motors up to 150 hp, magnetic hydraulic and electric-hydraulic brakes, controllers, Magnetorque ac crane control, contactors, limit switches and other types of electrical equipment for cranes are described and illustrated in 32-page bulletin C5-1.

78. Heat Treating Ovens

Detroit Sheet Metal Works—Heat treating ovens, heated by gas, oil or electricity and capable of temperatures up to 1000° F are illustrated and briefly described in 4-page bulletin 52-1.

79. Fluxless Soldering, Etc.

Sightmaster Corp. of Illinois, Chemalloy Div.—So, if you intend to weld, solder, braze or tin aluminum or zinc base metals or alloys, you should read this 2-page technical bulletin. It describes Chemalloy metal, tells how it is used, outlines advantages and uses.

80. Sweeper Attachment

Little Giant Products, Inc.—Meet the Yard Bird, a sweeper unit designed to fit all fork lift trucks. It is described (illustrated, too) in two bulletins and its specs given. Up to 80,000 sq ft per hour it sweeps, already! And it has its own sprinkler and snow mover.

81. Bulk Material Conveyor

Brady Conveyors Corp.—Principle of operation of the Brady Flo-Veyor is to admit low or high pressure air into the unit's pressure vessel to create an aerated mixture which flows wherever a pipe line can be run, regardless of distance and number of bends. Read about it in 4-page illustrated bulletin.

82. Cable Conveyor Systems

Cable-Link Corp.—"Is your operation still chained to materials handling down time?" asks this 6-page folder on cable conveyor systems. Whether so or not, it would pay you to peruse this illustrated bulletin, as it gives much data on this handling system, including its features and advantages.

83. Enclosed Motors

Allis-Chalmers Mfg. Co.—Types APZ and APK fan-cooled and totally enclosed electric motors are described in illustrated catalog 51B7225A. Large cut-away drawing shows cooling and

For Foundrymen

other construction features. Ratings range from ½ to 100 hp. Dimensions and other specs are given.

84. Powered Wheelbarrow

Prime-Mover Co.—Series of illustrated bulletins shows applications of the Prime-Mover 5 hp ¾-ton capacity wheelbarrow and platform truck in maintenance operations and handling heavy castings and bulk materials. It really gets a "V" for versatility.

85. Sand Mixer

Federal Foundry Supply Co.—Although it could be called a "whirled-beater", the Whirlmix sand mixer isn't. Machine is pictured and its specifications given in 4-page bulletin WH-4. Four models have capacities from 15 to 600 lb of core oil sand.

86. Crane Scale

Streeter-Amet Co.—Electronics has come into its own in the weighing business as you will notice after reading this 4-page illustrated bulletin on the Ametron electronic crane scale for heavy industrial weighing and remote recording. It combines weighing and transporting operations.

87. Metallurgical Services

Charles C. Kawin Co.—"50 Years of Practical and Reliable Metallurgical Services" is an illustrated booklet of 12 pages which outlines company's services, including chemistry, spectrography, physical testing, metallography, metallurgical and foundry consulting.

88. Foundry Ovens

Michigan Oven Co.—Foundry ovens with maximum air recirculation horizontally are shown in 4-page bulletin 1152. Installations are pictured, and eight engineering advantages are listed.

89. Flask-Lift Machines

Tabor Mfg. Co.—Machines for jar, plain-squeeze and jar-squeeze flask lifting get full attention in 12-page bulletin 531. Operation is reportedly shockless, as well.

90. Foundry Chills

Fanner Mfg. Co.—In the foundry a chill is defined as a product or material which, by coming into contact with molten metal, absorbs heat quickly and hastens solidification. In 28-page catalog 1153, over 18 different types of chills, both internal and external, are featured with price, ordering and application data.

91. Bulk Material Conveyor

Brady Conveyors Corp.—How the Flo-Veyor system transports granulated, lumpy and bulk dry materials to remote delivery points is related in 4-page available folder. Material can be conveyed wherever pipe line can be run.

92. Some Casting Products

Delta Oil Products Co.—This trio of literature pieces offers instructions for use and application of the following products: Delta sand conditioning oil and 96B sand release agent, Delta No-Vein compound and core rod dip oil and Delta Partex and liquid parting.

93. Parting Compound

Frederic B. Stevens, Inc.—Four-page form DP describes two parting compounds which have been developed for foundry use. These are Sno-White non-silica parting compound and Stevens Columbia, a flocculent silica parting.

94. Silicone Greases

Dow Corning Corp.—How to lubricate bearings that see service in your core ovens and the other plant "hot-spots"? Dow Corning technical bulletin 6-200 describes properties and applications of silicone greases of interest to foundrymen.

95. Core & Mold Coatings

Leeco Products -- Folder describes core washes. There are types for gray iron, steel, nonferrous and open hearth applications, each having mica base with high refractory action, eliminating carbon, graphite or metallic pickup.

96. Maintenance Welding

Harnischfeger Corp.—"Simplified Repair & Maintenance Welding" is title of 24-page pocket-size illustrated manual. It suggests how and what to weld and what materials to use. Shows various repair and maintenance electrodes and two AC welding machines.

9-53

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97. Coatings & Penetrants

Foundry Rubber Inc.—Designated as Para-Products, group of protective coatings, compounds, penetrants, and specialized products for foundry, industrial and commercial use is described in 18-page catalog 100. Application data are highlighted.

98. Sand Control

Harry W. Dietert Co.—4-page illustrated bulletin describes a complete automatic foundry sand control system. Half a dozen units are united and centrally controlled to give hour-glass precision. Bulletin analyzes individual units and shows how they are integrated.

99. Sand Conditioning Machine

Thomley Manufacturing Co. — The Discerator sand conditioning machine handles up to 20 tons of molding sand an hour or seven to ten 12 x 18-in. molds a minute. Data sheet gives features, which include portability, automatic screen shakeout, sand and moisture control, water injection and molding action.

100. Corebox Vents

Andrea Manufacturing Co.—Corebox vents are subject of illustrated folder. It gives available sizes, depths of head and widths of slots. Company will also make vents to your specifications.

101. Sand Additive

Whitehead Brothers Co. — 32-page handbook gives technical data on casting sand mixes, and on the properties of Lyquaface, a water emulsion facing of high boiling point pyrobitumens which tends to increase permeability and also makes possible lower moisture levels. How to mix compositions for different results is described.

102. Pyrometers

Claud S. Gordon Co.—Uses and applications, descriptions and photos of Xactemp pyrometers for high and low temperature indications are found in 4-page bulletin XT-3-51. Prices are given, too.

103. Air Control Valves

Ross Operating Valve Co.—Including pilot and direct operated, remote control, miscellaneous and special types, air control valves are subject of 12-page illustrated bulletin 101A. Operating principles and flow circuits are diagrammed and applications illustrated. Units are of the poppet type, with a positive, quick-opening seal.

104. Are You Efficient?

Fischer & Associates—An efficiency analysis of all foundry operations, both ferrous and nonferrous, is provided by the "Profact Foundry Check List" which points out "weak spots" in production equipment and methods. Two-page check list is easily and quickly filled out and is part of a 4-page folder that outlines ten Fischer foundry engineering services. An impartial, objective analysis is sent you without obligation.

105. Box Car Unloader

Butler Bin Co., Carscoop Div.—"It's Speed That Gets the Winner's Flag" says this 6-page illustrated folder on the Butler 102 scoop type box car unloader which features maneuverability, short turning radius and speed. Various features and applications, plus specifications are covered.

106. Wire Rope Assemblies

Macwhyte Co.—24-page illustrated catalog 5201 describes and illustrates the many types of Safe-Lock wire rope assemblies made by this company. All the dope on each type is there, along with ordering info and data on wire rope and assemblies.

IMPORTANT READING FOR FOUNDRYMEN

We have a limited quantity of the following reprints which we can furnish while they last.

107. Where-to-Buy-It

Everything from Abrasives to Zircon Sand is listed in FOUNDRY's Where-to-Buy Foundry Products Section. A 16-page reprint is offered. Check this number. Company names and addresses are given for each of the many listings.

108. Shell Molding Process

"The Shell Molding Process—Its Mechanics and Applications" is a reprinted FOUNDRY article that is good reading. In word and picture, three experts present much valuable information.

109. Ford's Cleveland Foundry

One of the outstanding articles appearing in recent issues of FOUNDRY is "Ford's Cleveland Foundry." Now available in reprint form, it describes in exacting detail the equipment and operations of this new and up-to-the-minute plant. Fifty-six pages of facts, figures, pictures and diagrams.

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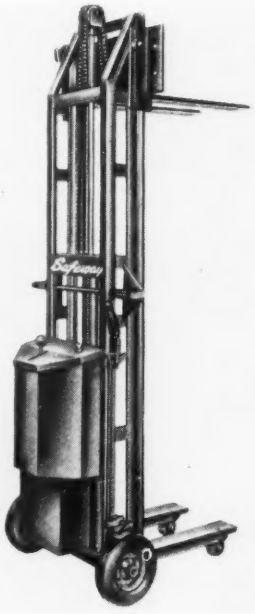
(*Continued from page* 274)

noxious but relatively harmless odors. Facepiece of formable aluminum can be shaped easily by hand to fit face contours. Facepiece cushion is of soft sponge rubber. Replaceable plastic cartridge is factory packed to prevent crushing or channeling of the charcoal fill. An auxiliary overlay screen keeps paint globules out of the cartridge. A package of these screens is provided with the respirator.

For More Details Circle No. 12—Page 278

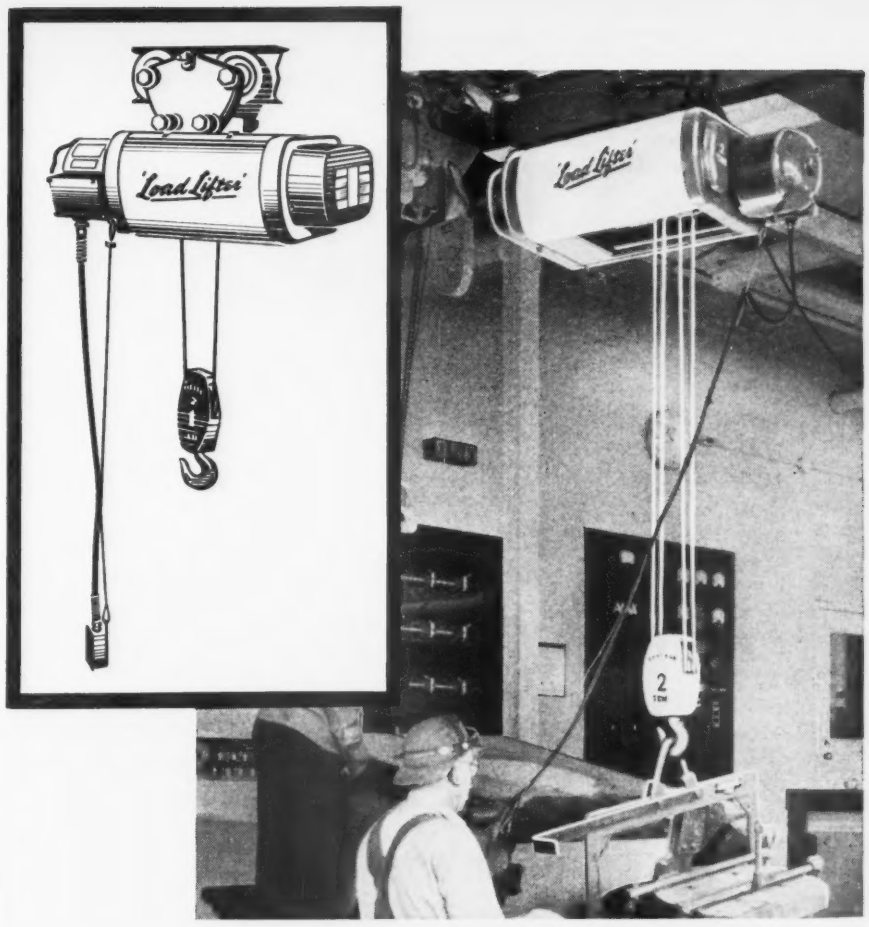
Fork Lift Truck: Safeway Industrial Equipment Corp., 184 North Franklin St., Chicago 6—Portable fork lift truck for one-man operation



is made in three sizes with lifting heights of 68, 80 and 100 in. and has a lift rating of 1250 lb. The hydraulic system is powered by an automotive type battery and is equipped with a built in charger with automatic cut-off and trickle charge. Truck is equipped with an electronic switch to cut off power at maximum height to prevent jarring the load or damaging the hydraulic system. Hand-operated brake prevents movement of truck during loading and unloading and brakes the truck when it is traveling up and down inclines. Although the unit is of the fork lift type, it can be equipped with a "snap-on" platform to make it an all-around combination lift truck.

For More Details Circle No. 13—Page 278

Duct Fan: Chelsea Fan & Blower Co., 639 South Ave., Plainfield, N. J.—Direct drive duct fan with totally enclosed ball bearing motor is built into a steel drum with rear and front mounted flanges. Cast aluminum blades are nonoverloading. Fan is recommended for temperatures up



WHERE CAREFUL HANDLING IS ESSENTIAL...

USE THE TWO-SPEED *Load Lifter*®

HANDLE WITH CARE is the watchword when setting cores, drawing patterns, closing flasks, and many other lifting jobs that require delicate, accurate handling. The two-speed Series "700" 'Load Lifter' is ideal for such lifting jobs. It has a slow creeping speed — one-third that of high — and this speed doesn't vary with the load. No sudden jerky starts. Lifting and lowering action is smooth and safe.

SAVE TIME, EFFORT. With the two-speed push-button control, one hand is always free to guide the load. Spotting is easier, more accurate. Loads are handled at the right speed at the right time.

GET ECONOMICAL, LASTING SERVICE. The 'Load Lifter' is precision-built for heavy duty. Heat-treated helical gearing provides greater strength. Ball bearings throughout minimize frictional wear. Simple construction assures trouble-free service. The 'Load Lifter' has every feature to safeguard man, load, hoist — only 24 volts at the push button, concealed wiring, powerful synchronized motor and load brakes, steel suspension, over-capacity load hook.

INVEST IN THE TWO-SPEED 'LOAD LIFTER' for safe, effortless lifting at low cost. Capacities from ½-ton up. Ask your local Shaw-Box Distributor for details or write for Bulletin No. 399.

***Load Lifter*® ELECTRIC HOISTS**

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, and 'American' Industrial Instruments.

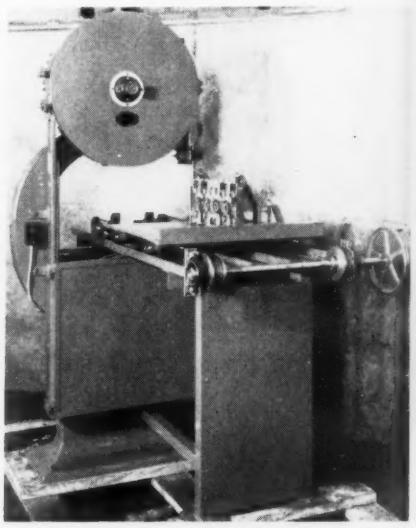
to 110° F, but is available for higher temperature on special order. Sizes range from 16 to 48 in., capacities from 2900 to 37,500 cfm. A belt-driven model with motor and belt located out of air stream also is available.

For More Details Circle No. 14—Page 278

Scarfing Equipment: Milwaukee Shipbuilding Corp., 3718 West Lancaster Ave., Milwaukee 9—Flame cutting equipment for scarfing the edges of curved metal pieces operates vertically, horizontally and at angles from the first two directions as it scarfs. Flame cutter moves under power as it follows the curve of the metal. Cutting flame slants at a constant angle from the desired apex of a scarfed edge. Four spring-loaded drive rollers and a spring-loaded idler roller keep the moving unit true to the path of a system of twin rails which rise, fall, tilt and turn to match the metal under process. Powered by a 1/25-hp motor, the drive rollers move at speeds up to 15 ipm. The unit is made in a standard size and the torch cutting equipment is obtained from well known suppliers, but each set of rails and the accompanying fixture must be built for the piece of metal being processed. A unit has been made big enough to hold a casting measuring 4 x 8 ft and to permit cuts of 16 linear ft along three sides at an angle 22 degrees off horizontal (at greater angles, slag falls on the head). Metal can be cut in thicknesses from ¼ to 8 in. at speeds up to 15 ipm.

For More Details Circle No. 15—Page 278

Band Saw: Moak Machine & Tool Co., Port Huron, Mich.—Special 26-in. band saw is used to saw automotive cylinder head castings to



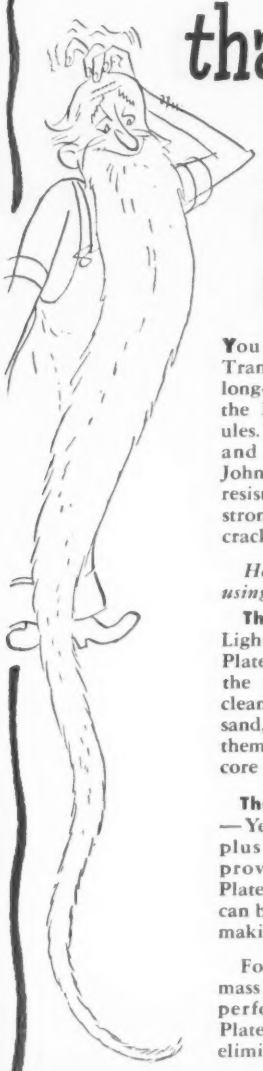
check the uniformity of wall thickness in water jacket and the efficiency and uniformity of coring on the inside. It will saw a cylinder head through any section and in any location. The machine is built around the company's standard 26-in. band saw, but is equipped with a special slow speed 1½-hp geared head motor that delivers the correct output speed for sawing cast iron. It is provided with a steel table equipped with ball bearing rollers that travel on fully machined rails. The gravity feed mechanism includes a hand wheel and a ratchet for rapid return. The hydraulic cylinder is attached to the table, not only to regulate the uniformity of feed, but also to prevent any jumping of the table through voids in castings. Table is 30 x 30 in., travels 31 in. and is 33½ in. from the floor. Distance from saw blade to frame of machine is 25½ in.

For More Details Circle No. 16—Page 278

Face Shields: Boyer-Campbell Co., 6540 St. Antoine St., Detroit 2—New models of the firm's No. 300 face shields include sliding buttons

(*Continued on page* 282)

Looking for core plates that LAST LONGER?



. . . then use TRANSITE CORE PLATES that stay on the job year in, year out

You can rely on durable Transite* Core Plates to give long-term service, even under the heaviest foundry schedules. Made of fibrous asbestos and cement, by a special Johns-Manville process, they resist shock and corrosion, are strong and durable, will not crack or break easily.

Here are more reasons for using Transite Core Plates:

They speed production—Light-weight Transite Core Plates are easier to handle on the job. They're easier to clean, too . . . core wash, sand, etc., do not adhere to them as readily as to other core plate materials.

They maintain accuracy—Years of foundry service, plus exhaustive tests, have proven that Transite Core Plates do not warp readily . . . can be used for precision core making indefinitely.

For core plates of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time. For full details, write Johns-Manville, Box 60, New York 16, N. Y.

JM PRODUCTS

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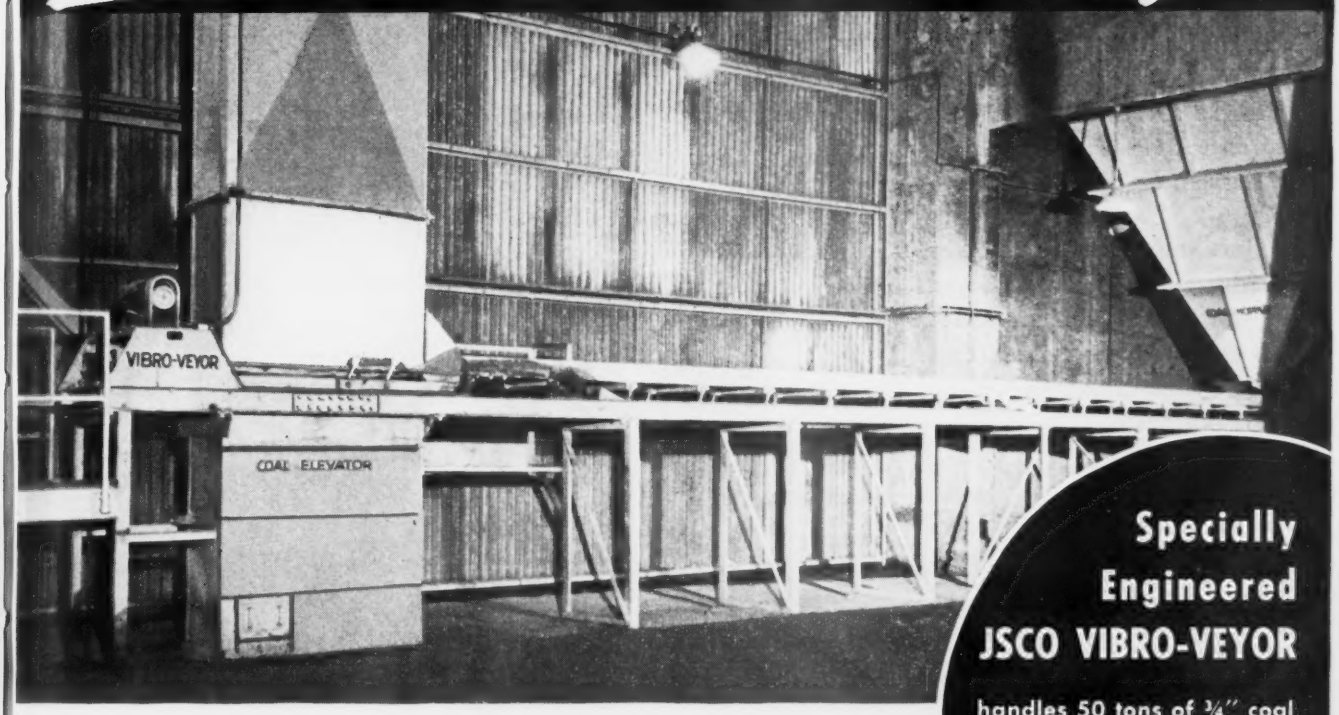
Johns-Manville TRANSITE CORE PLATES

Made of Asbestos

KEEP IT MOVING!



Specially Engineered JSCO VIBRO-VEYOR

handles 50 tons of ¾" coal per hour. It delivers coal from storage to bucket elevator, and is driven by #135 shaker with a 2 H.P. motor.

Save Time and Labor in Moving BULK MATERIAL with the Rugged, Economical VIBRO-VEYOR

Cut your plant conveyance costs — increase moving capacity and efficiency with the JSCO VIBRO-VEYOR! The rugged force of the straight line reciprocating motion built into the entire length of each VIBRO-VEYOR gives an even flow and level plane of materials — gives low cost motion and low power consumption!

Excellent for foundry sand, ore, aggregate, coal, metal chips and turnings, or chemicals.

CHECK THESE ADDITIONAL FEATURES

Low head room; choice of motor location.

Intermediate discharge gates and/or intake spouts.

No spillage— no openings or loose joints.

Self cleaning— no pockets to obstruct flow.

Safe for men to work around (after protecting drive belts).

Ideal when dust, abrasion, corrosion or contamination problems exist.

Write for additional information to:

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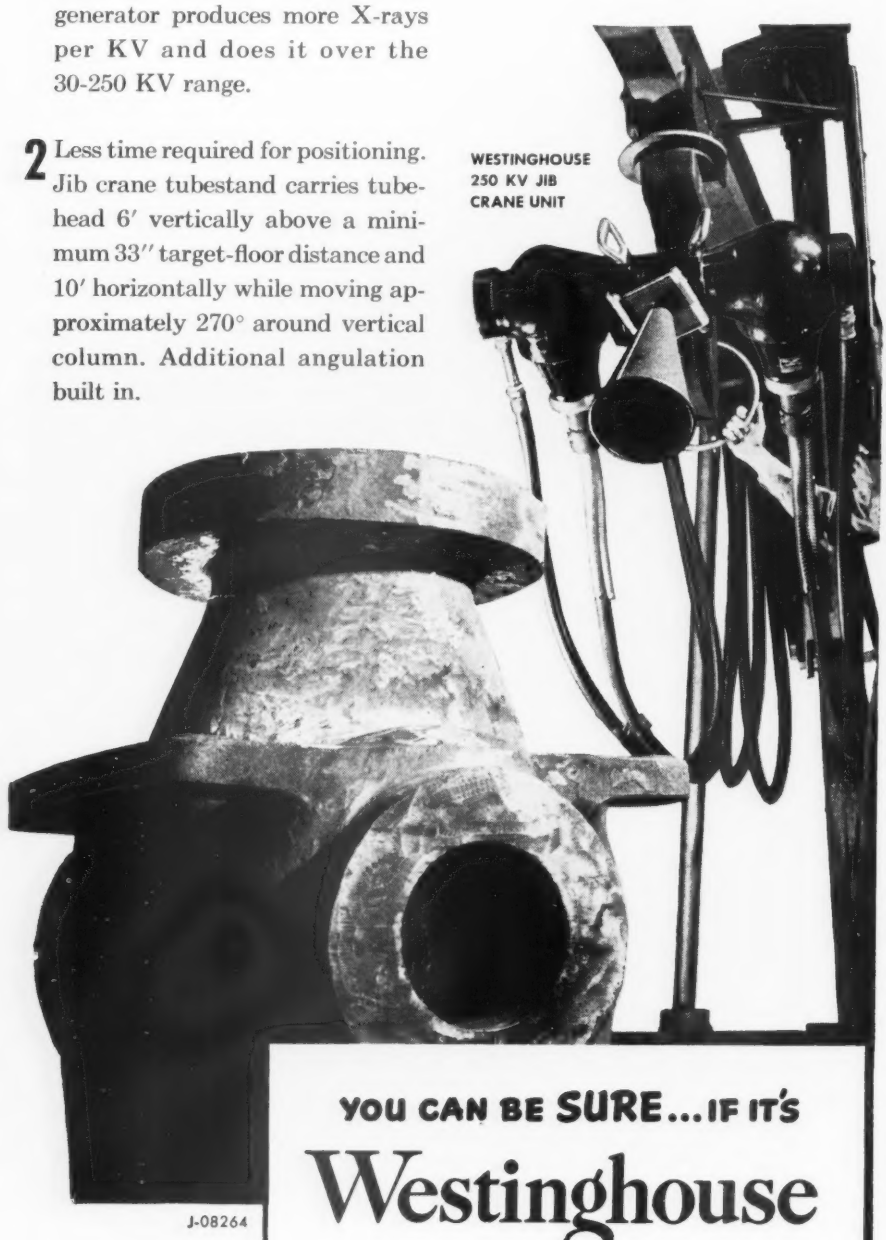
TOUGH JOBS *made easy*

At American Steel Foundries' plant in Newark, New Jersey, inspection of heavy steel castings is made easy by Westinghouse Industrial X-ray equipment. Reason: extreme *flexibility*.

1 Thick *or* thin materials take less time to radiograph. Westinghouse *Constant Potential* high voltage generator produces more X-rays per KV and does it over the 30-250 KV range.

2 Less time required for positioning. Jib crane tubestand carries tubehead 6′ vertically above a minimum 33″ target-floor distance and 10′ horizontally while moving approximately 270° around vertical column. Additional angulation built in.

Westinghouse assures you the finest, most flexible X-ray tools for your inspection jobs *plus* a coast-to-coast staff of technical experts. Call your Westinghouse X-ray representative or write Westinghouse Electric Corporation, 2519 Wilkens Avenue, Baltimore 3, Maryland.



WESTINGHOUSE 250 KV JIB CRANE UNIT

J-08264

YOU CAN BE SURE...IF IT'S

Westinghouse

(*Continued from page* 280)

for the mounting of windows on the headgear. This feature permits fasteners to slide to conform to changes in size caused by warpage of the headgear after its exposure to moisture and heat. The mounting has been adapted to plastic windows for general utility, to screen windows for protection from heat and scale and to fiber fronts with glass holders for gas welding, scarfing and other work.

For More Details Circle No. 17—Page 278

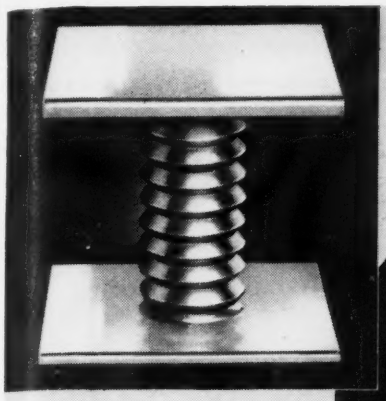
Shoe Toe Clips: Standard Safety Equipment Co., 232 West Ontario St., Chicago 10—Lightweight, detachable steel shells that fit over work shoes are stated to provide low-cost, adequate protection for the toes of workers who refuse to wear safety

shoes or cannot wear them because of a foot deformity or who are employed only temporarily. The toe clip first is tightened in a vise until it is the desired size. It next is placed over the toe of any square-toed or bulldog type shoe and is nailed into place. A reinforced band across the top and down both sides to the bottom provides added strength and resistance to impact. A mounting flange seats the clip firmly in place and serves as the anchor for attaching the toe clip to the shoe. The device also is available with spring and wire mounting for intermittent wear.

For More Details Circle No. 18—Page 278

Cold Process Solder: Woodhill Chemical Co., 1391 East 33rd St., Cleveland—Plastic metal base cold process solder for filling imperfections in castings, patterns and other metal surfaces is applied cold, just as it comes out of the can, with a spatula or a putty knife, and dries to metal hardness when exposed to air, generally in 20 minutes or so if room temperature is 70°F or higher. Drying time depends on how thickly the solder is applied. When dry, it can be ground, filed or sanded to a

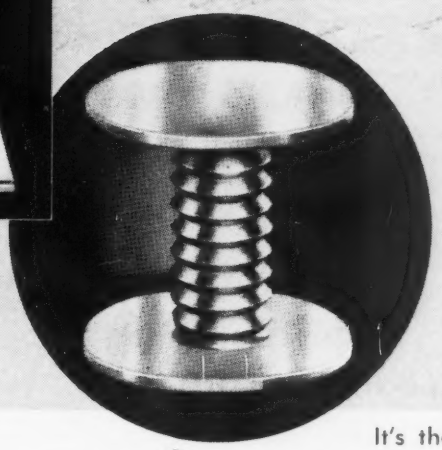
(*Continued on page* 284)



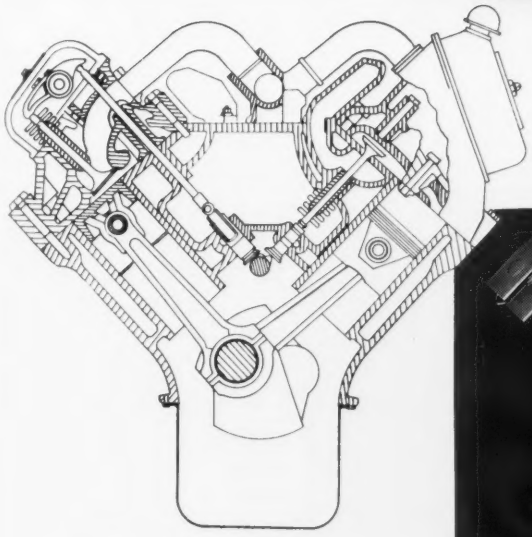
Double Head Thread Stem Chaplets for use on heavier castings. Available in heights for practically any section of metal. Stem diameters range from ⅛" to 1¼". Designs to meet all core and mold conditions.

It's The Unusual Features of *Milwaukee* CHAPLETS

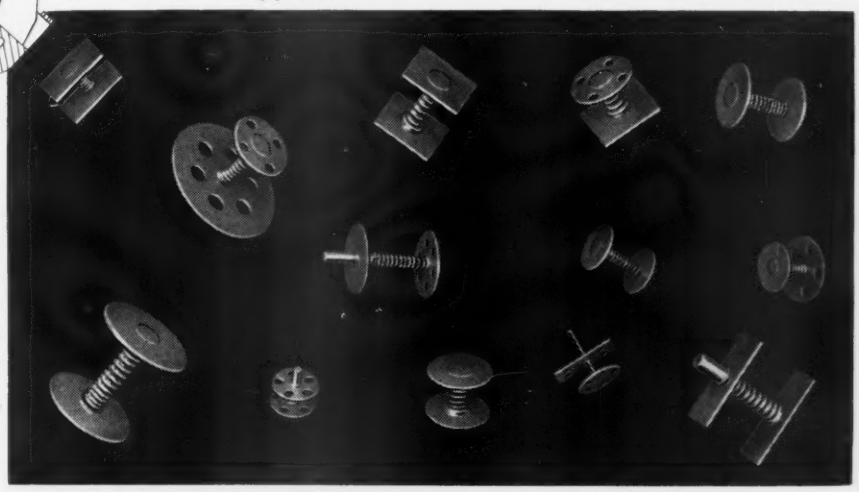
that insure Leak-Proof fusing and proper core support



It's the sharply cut "thread stem" design that insures leak proof fusing. Metal melts at the edges first, that's why the sharp edges "burn in" quickly and completely to insure instant fusing which results in freedom from leakers. Here is a design where fusion takes place at exactly the right speed to give you both instant fusion plus proper core support.



Cross Section of a standard "V" engine — a typical casting where proper "burning in" is imperative. Milwaukee Thread Stem Motor chaplets ARE doing an outstanding job on this kind of casting.



MILWAUKEE THREAD STEM MOTOR CHAPLETS

When light castings are subject to gas, steam, water, and other pressures, Milwaukee Thread Stem Motor Chaplets are specially recommended because they cut scrap losses due to leakers. Perforated heads allow trapped gases to escape . . . the lighter mass eliminates chill and because metal melts from edges, you have more edges resulting in a better opportunity for melting and complete fusing.

Add to this, uniform high quality, sturdiness of construction, an excellent protective coating and manufacturing to precision tolerances, and you soon discover why Milwaukee Chaplets are the favorite of the industry.

Motor Chaplets are available in round or square double heads from ⅜ " to 1" with the famous "thread" stem from 1/16" to ¼" in diameter.

If you have an unusual product or production problem where a specially designed chaplet or chill is required, we invite your engineering staff to consult with ours for the proper solution to your problem. **Milwaukee Chaplet & Mfg. Co., 1023 South 40th St., Milwaukee 15, Wis.**

MILWAUKEE CHAPLET

(*Continued from page 282*)

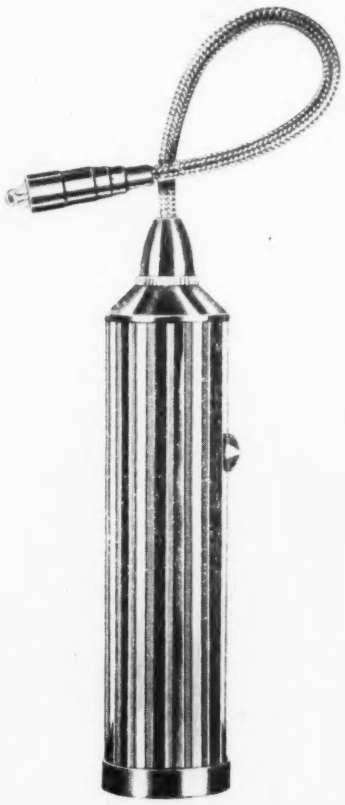
feather edge. It will flex and is said to be particularly suited for applications which require shock resistance. Can sizes range from 6 oz to 3 lb. The solder is guaranteed not to congeal or harden in the can.

For More Details Circle No. 19—Page 278

Vernier Caliper: George Scherr Co., 200-R Lafayette St., New York 12—New model of the company's universal vernier caliper for inside, outside and depth measurements now is made entirely of stainless steel with 14 per cent chrome steel. With 25 lines covering 49 graduations of the scale, the new vernier is more than double the size of the former type, which was ⅝ in. long, covering 24 lines of the main scale. A new gib construction of slide, with hardened, self-lubricating phosphor bronze spring gib, accurately machined and fitted into the narrow upper side of the slide, has been added. Two adjusting screws are provided to take up wear and to assure squareness of the measuring jaws. Scales and verniers read 1/1000 in. on the lower front, 1/128 in. and fractions on the upper front and 1/10 mm on the back.

For More Details Circle No. 20—Page 278

Inspection Lights: Ericson Mfg. Co., 5209 Euclid Ave., Cleveland 3—Light assemblies of two models of small, battery-operated inspection

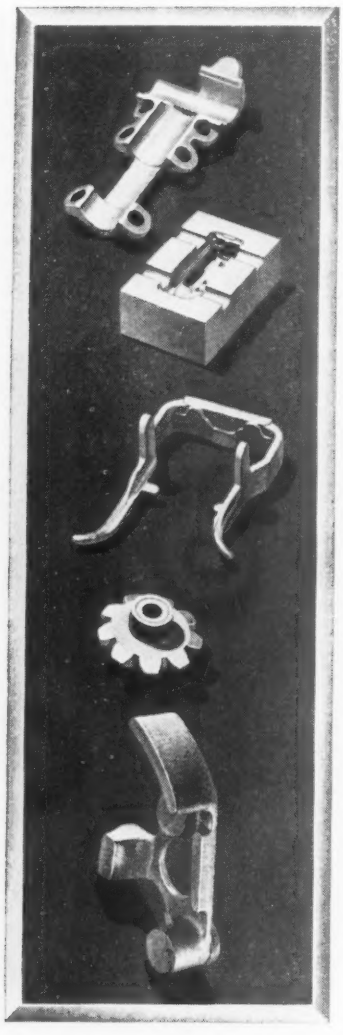


lights will go through holes as small as ½-in. diam. Barrels are of all-metal construction, and extensions are of flexible, woven, metallic shielding. Standard dry cells fit loosely in the barrels, which are oversize to allow for possible swelling of cells. A heavy duty switch slides the batteries into contact with the bulb, eliminating stamped brass parts. Applications are said to include inspection of small openings, as in foundry cores.

For More Details Circle No. 21—Page 278

Bin-Flow Device: Gerotor May Corp., Baltimore 3—Device to make bulk materials flow freely from bins and hoppers consists of pulsating panels mounted inside bin or hopper walls and of an automatic air control to regulate their action. Made of a speical Neoprene compound, the panels alternately are inflated and deflated to move materials by positive displacement. This action prevents stoppage caused by arching or funneling and prevents accidents to

(*Continued on page 286*)



Various sand-cast Berylco beryllium copper parts. For complete information on alloys available, write for your free copy of the recently published Product Directory.

WHY BERYLCO BERYLLIUM COPPER IS IDEAL FOR SAND CASTING

Production men say the thing they like about Berylco is its excellent castability. Here's the metal for maximum "as cast" detail.

The low pouring temperature of beryllium copper (nearly 1000 degrees less than steel) greatly simplifies foundry procedure—makes it easier to handle, too. Foundrymen pouring bronzes can readily take on Berylco casting alloys. Molding and gating techniques follow manganese or silicon bronze practice. The intricate detail which Berylco makes possible not only gives the designer greater freedom, but substantially reduces the necessity for machining.

Where required, high-strength Berylco alloys can be readily machined when soft, then hardened by a simple low-temperature heat treatment. High conductivity alloys can be easily machined in the fully heat-treated condition.

The heat-treatable feature of Berylco offers a combination of high final properties not otherwise obtainable. Age-hardened Berylco castings deliver tensile strengths up to 180,000 psi, hardnesses to 450 Brinell, or conductivity as high as 50 percent, depending upon the alloy selected. These are some of the reasons why Berylco beryllium copper is being used more and more in heavy electrical, electronics, resistance welding, machine tool and other mechanical applications.

Plan now to increase your range of alloys with versatile Berylco beryllium copper. Berylco is available in 5 lb., 2½ lb. and 3 oz. ingots. Send for your trial order today.

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PERFECT SAND PREPARATION CAN BE AUTOMATIC

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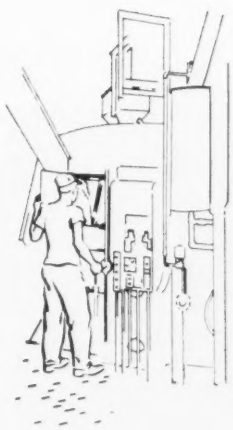
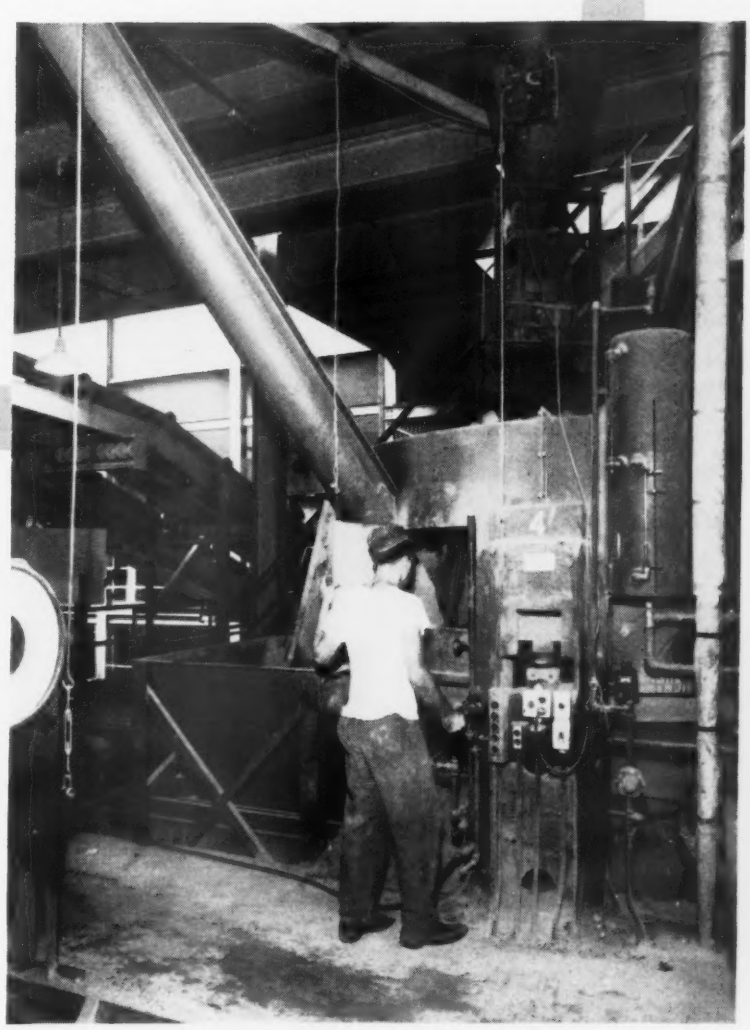


Any Clearfield Mixer can be made completely or partially automatic by the addition of suitable time control apparatus. Thus you can substitute a predetermined, uniform procedure for the individual judgment of the operator, controlling minutely the length of tempering, the quantity of bond and all other factors. The result is consistent uniformity in the characteristics of your sand, one of Clearfield's many outstanding services.

For any sand preparation need there's a Clearfield Mixer. Write today for Catalog No. 83 for complete details.



One of nine No. 920 Clearfield Mixers, all equipped with automatic controls, located in a large Eastern industrial plant.

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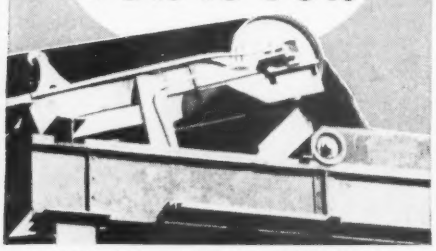
MOTORIZED HEAD PULLEYS Slash CONVEYOR DOWNTIME 70% to 90%



U.S. PATENT No. 3548399 — OTHERS PENDING

HERE'S WHY!

- No chains, sprockets, sheaves, out in the weather and dirt!
- No chain idlers to keep adjusted or oiled!
- No V-belts to be continually checked, adjusted and replaced!
- No shafts and drives to service and lubricate!
- No motors exposed to damage or weather!

Everything CONTAINED within the pulley!

IT'S *motorized* to eliminate expensive upkeep and cut downtime to the barest minimum on all belt conveyor or belt-bucket elevator operations. *All moving parts are inside the pulley,* enclosed and protected by the pulley shell from weather, dirt and damage. Operation is simple...the pulley shell rotates around the electric motor and reduction gears, which are held stationary by a torque arm attached to conveyor frame. Compact, easy to install, *economical* . . . get complete details from your nearest distributor, or write for Bulletin MP-1 today!

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(Pulley and Sprocket Department)
Benicia, California

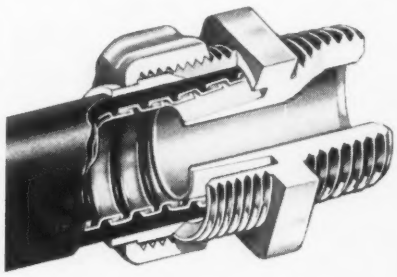
IOWA
MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

(*Continued from page* 284)

workers attempting to dislodge material from the top. The panels are said to operate noiselessly and to deliver a uniform flow at the discharge. The device is applicable to all types of hoppers and bins and handles bulk materials weighing from 2 to 200 lb per cu ft at temperautres up to 135° F.

For More Details Circle No. 22—Page 278

Conduit Fitting: Thomas & Betts Co., Elizabeth, N. J.—Fitting for liquid-tight flexible conduit mates with any conduit spiral and doesn't



have to be taken apart when installed, according to its manufacturer. Said to be ideal for machine tool wiring or for other electrical circuits exposed to corrosive liquids and mineral oils, it is made in straight, 90-degree and 45-degree elbow designs and accommodates conduit from ⅜ to 2 in. trade size. Only one wrench size is needed for the gland and the body. The end of the fitting facing the junction box is long enough to accommodate double locknuts. In the three smallest sizes, the body of the fitting is cast from a high-strength zinc alloy. Other sizes are made of malleable iron.

For More Details Circle No. 23—Page 278

Aluminum Welding Flux: Solar Aircraft Co., 2200 Pacific Highway, San Diego 12, Calif. — Aluminum welding flux is said to permit operator to see exactly what he is doing. The flux starts to reduce oxides immediately upon application and continues to do so throughout the heating cycle. It reportedly is removed easily after welding and will not produce corrosive pitting on the parent metal. Because it becomes liquid at the point in the heating cycle when the metal is ready to weld, it serves as a good temperature indicator. Excellent wetting qualities make application easy. Oxyacetylene can be used with it without undue fear of overheating. Manufacturers claim that the flux can be used as a backup material on butt or T-joints to control penetration and can be used

Core Hardness

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with

Gordon & Campbell CORE HARDNESS TESTER

Why take chances with questionable cores? With this simple tester you obtain the true hardness value by measuring a definite depth of penetration of a spring-loaded abrading point. The hardness value is read direct on the graduated dial—no computation.

The Gordon-Campbell sand testing units offer the latest improvements for checking these critical properties of sand mixtures: clay content, permeability, bond strength, moisture, core hardness, and core strength. The tests are quick, and no calculations are required. They offer the simplest approach to sand control.

Write for full particulars on Gordon-Campbell sand control units. Savings in scrap losses will pay for these testing units.

All Gordon-Campbell sand testing units are designed to conform with the recommendations of the Committee on Foundry Sand Research of the American Foundrymen's Society.

FREE TO ANY FOUNDRYMAN

Write for this booklet. It explains foundry sand control and how to reduce scrap losses.

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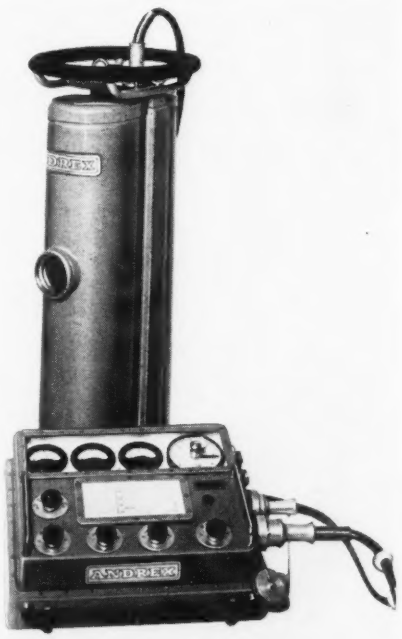
to eliminate the oxide notch on the back of the work. No puddling stick is needed, according to the company. Flux is available in 1-lb containers.

For More Details Circle No. 24—Page 278

Cranes: Orton Crane & Shovel Co., 608 South Dearborn St., Chicago 5—One-man cranes for mobile yard work now feature the General Motors Allison torque converter, which is asserted to eliminate slip-clutching and jerking to start heavy loads and avoids racing the engine when there is no load. The new installation thus cuts wear on gears and shafts, reduces maintenance and increases the operating facility so that application of only the exact amount of power needed moves the load at all times without operator manipulation.

For More Details Circle No. 25—Page 278

X-Ray Unit: Holger Andreasen Inc., 703 Market St., San Francisco —Portable, 250-kvp industrial x-ray unit made by Andrex weighs less than 350 lb, including control unit. High-tension cables, cooling connections, separate transformers and cooling pumps have been eliminated. X-ray tube and other high-tension parts are combined in a single all-welded



steel tank. The unit assertedly will penetrate 4 in. of steel. Focal spot is 4 mm, and a 17-in. film is covered at a focus-film distance of 24 in. Supply voltages are 110-220-440 v, 50-60 cycles.

For More Details Circle No. 26—Page 278

Metal Primer: Foundry Rubber Inc., 6100 River Rd., Washington 16—Red lead metal primer is reported to form a tough, hard, adhesive

STABLE heat-treated properties without heat treatment!

...Federated TENZALOY

TENZALOY is a high strength aluminum alloy of the aluminum-zinc-magnesium type. Castings of Tenzaloy have heat-treated properties *without heat treatment.* And they retain these high "as-cast" properties indefinitely.

TENZALOY properties are stable; this is proved by test data taken over a four-year period. These "final" properties can be obtained in any foundry by room-temperature aging for 14 days . . . or by artificial aging for about 10 hours at 250°F.

Other features of TENZALOY:

1. Requires no special foundry technique
2. Good castability; produces sharp impressions
3. OK for certain permanent molds
4. OK for plaster molds
5. No fluxes or additions needed
6. Produces silvery-white castings which take high polish
7. Takes excellent anodized finish
8. Top dimensional stability; will not "grow"

Full particulars are given in Bulletin No. 103. Graphs, tables, illustrations included. For free copy of bulletin, or to order, call or write any one of Federated's 22 sales offices or 14 plants across the nation.

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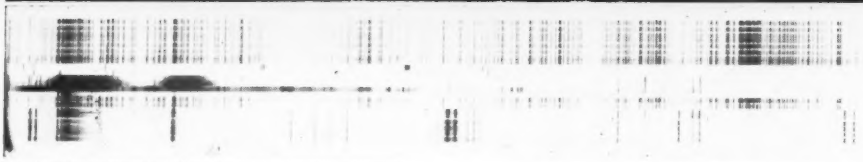

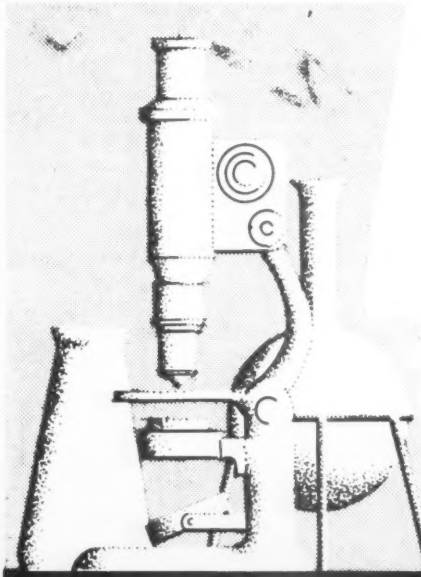

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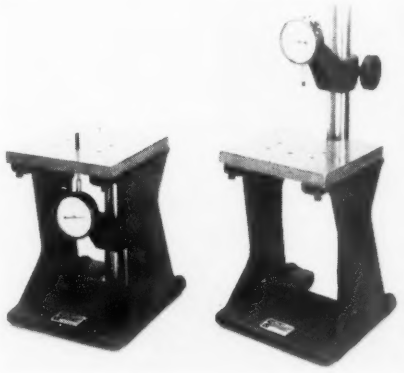
coating on galvanized metals, structural steel and similar surfaces and contains rubber to insure resistance to galvanic corrosion, acids, alkalis, chemicals, corrosive gases and moisture. Weighing 18 lb per gal, it contains about 12 lb of red lead as well as pure flaked lead, to improve brushability, speed drying and prevent "crawl" of subsequent coats. The primer can be brushed, sprayed or dipped on and dries quickly. It is supplied at brushing viscosity and can be thinned for spraying or dipping.

For More Details Circle No. 27—Page 278

Welding Helmet: Jackson Products, Warren, Mich.—Arc welding helmet of lift-front type is made with shell of one-piece, thermosetting plastic reinforced with glass fiber that resists high heat and voltage, moisture and spatter and is strong and easy to clean. Front of lens holder, made of high-impact molded plastic, holds protective filter lens and clear cover glass and swings up to permit inspection of work without raising entire helmet. Another clear glass stays in place to protect eyes. Headgear has wide plastic straps and replaceable, cork-padded sweatband. Helmet swings up on friction pivots, adjustable while the helmet is being worn.

For More Details Circle No. 28—Page 278

Gage: Acra-Ment Gage Division, Meyer Corp., 633 Park Ave., Cranston, R. I. — General-purpose gage will measure height, thickness,

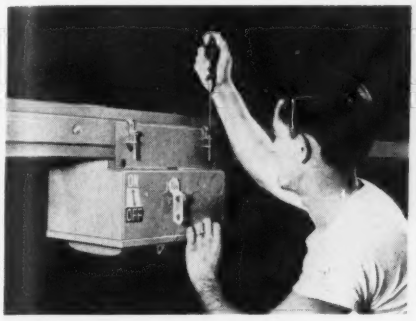


depth, counterbore depths and diameters and offsets. All these measurements are possible through use of the over and under convertible feature of the column and indicator position in reference to the platen surface. Cast base is made of Meehanite, and the gaging surface is of hardened steel. Tapped holes are provided in the platen to accommodate gaging fixtures and part position blocks to fit the particular part being gaged. A full-sized bench com-

parator, the instrument is a production station or inspection department gage.

For More Details Circle No. 29—Page 278

Power Plug: Trumbull Electric Dept., General Electric Co., Plainville, Conn.—Improved device facilitates getting power from overhead busway to machines below. For use with the company's power distribution system, it works on the same principle involved in plugging into a wall socket. It taps power from the busway carrying heavy current. Hangar clips speed up installation by holding the plug in position while screws are tightened to anchor it firmly to the housing. The use of grid pins, magnetic repulsion and other circuit breaker principles gives the interior a high momentary current rating. The plug is designed with heavy gage steel side shields which protect the copper prongs which contact the bus bars. Prongs are further protected by a phenolic shield that encases them and also provides electrical insulation. The plug is available in 30, 60, 100 and 200 amp ratings.

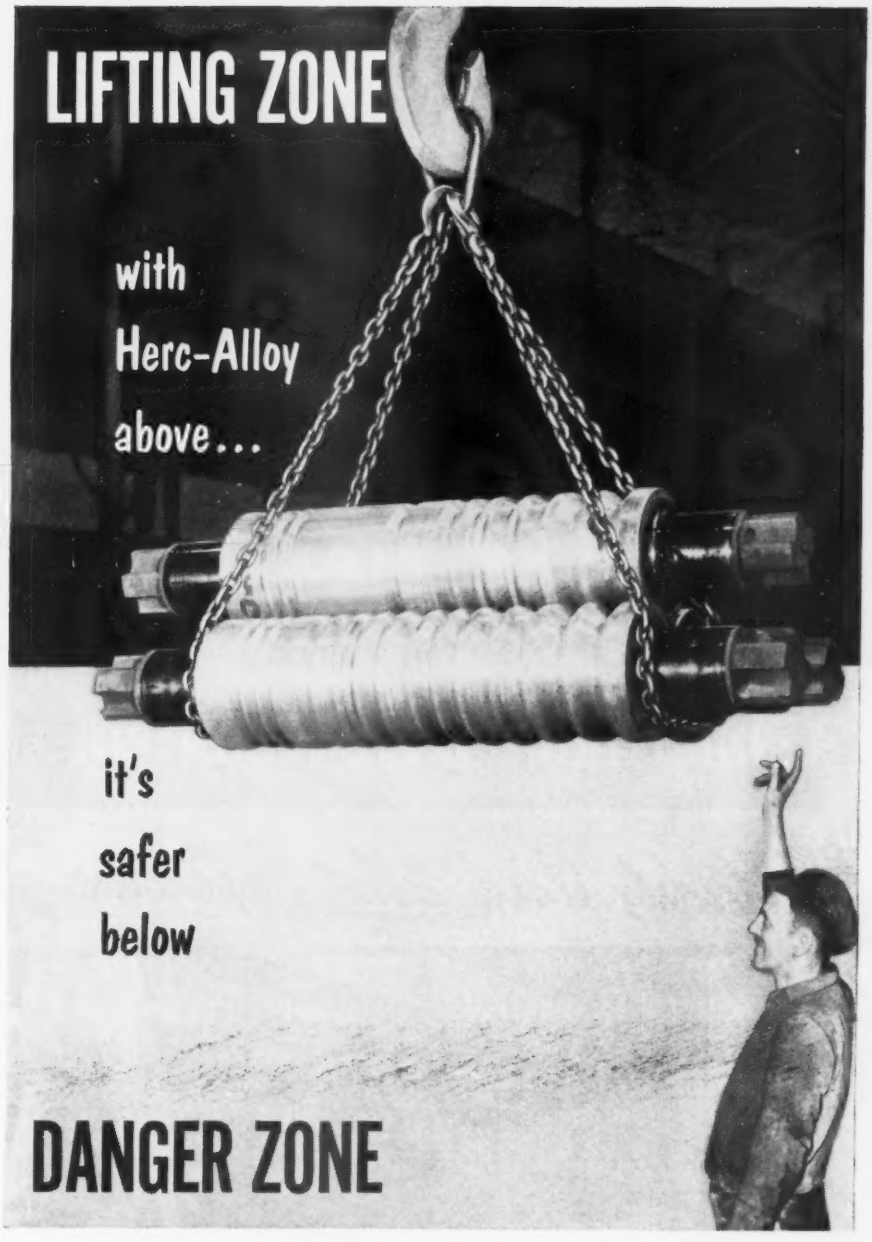


For More Details Circle No. 30—Page 278

Weight Recorder: Howe Scale Co., Rutland, Vt.—Mechanical weight recorder is built in as an integral part of the company's tape drive dial head. A touch on the push bar causes the weight to be printed in one second. Printing also can be controlled by a trip switch on a conveyor line or monorail system and by other methods. Unit is furnished with various adaptations — for standard straight ticket, for ticket and tape, for odd-sized tickets and with identifiers, manual or electrical time and date stamp, consecutive numbering devices and other equipment. Accuracy is guaranteed to 1/10th of 1 per cent of the dial chart capacity.

For More Details Circle No. 31—Page 278

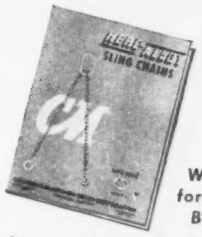
Engine Hour Meter: Towmotor Corp., 1226 East 152nd St., Cleveland 10—Hobbs engine hour meter now is available on all the firm's lift



SPECIFY

HERC-ALLOY

SLING CHAINS



Write for Data Book

HERC-ALLOY

Sling Chains are registered by individual serial number and can be rebuilt or replaced at any time to original specifications.

The Allegheny Ludlum Steel Corp., pictured above, uses Herc-Alloy Sling Chains for hundreds of tough lifting jobs in its plants. In addition to maximum safety, Allegheny Ludlum also enjoys the extra economy of longer-lasting Herc-Alloy. These sling chains offer still another advantage...a weight reduction unmatched by any other alloy chain without any sacrifice in tensile strength. This reduces worker fatigue. All things considered, don't you think Herc-Alloy Sling Chains are worth a try in your plant.

CM HOISTS AND CHAIN

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trucks and tractors as optional original equipment. It also can be installed on units already in use. The instrument permits accurate recording of all phases of operation and eliminates guesswork in scheduling all maintenance functions and periodical service checkups. Because it operates only while the ignition switch is turned on, the meter provides a basis for computing complete costs on specific handling jobs. It is adjusted and timed by the manufacturer, then sealed against tampering or foreign matter. After recording 10,000 hr of engine operation, the instrument automatically restarts at zero.

For More Details Circle No. 32—Page 278

Pipe Insulation: Gustin-Bacon Mfg. Co., 210 West 10th St., Kansas City, Mo.—One-piece, molded, fine glass fiber pipe insulation offers the following features: Exceptional thermal efficiency, light weight, flexibility, resilience, resistance to breakage, insolubility in water, ease of cutting and freedom from irritating dust and fibers. It can be painted and comes in quickly installed 6-ft lengths. It resists the attack of most acids and alkalis, is not corrosive to metals and will not rot, mold, decay or absorb moisture. It is suited for all heated piping applications up to 350° F.

For More Details Circle No. 33—Page 278

Air Centrifuge: Superior Separator Co., Hopkins, Minn.—Air centrifuge for dust removal and particle recovery works on an impelled centrifuge principle. It is claimed to

operate with high efficiency in the very small particle size ranges and to be continuous and nonvarying over an unusually wide variety of temperature and humidity conditions. Just over 7 ft high and 42 in. in diam, it has only one moving part. Dust-laden air enters the machine, is accelerated to the same speed as the rotor and moves into it through perforations. Some of the dust or solid particles are separated from the air and remain in the space between rotor and housing. Finer particles are removed by centrifugal force as they are blown upward with the partially clean air toward the clean air outlet tube.

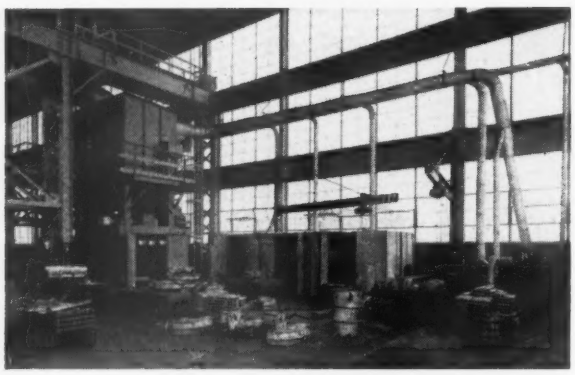
For More Details Circle No. 34—Page 278

Fire Extinguisher: American-LaFrance-Foamite Corp., Elmira, N. Y.—Wheeled, 50-lb carbon dioxide engine for extinguishing flammable liquid and electrical-type industrial fires weighs only 45 lb without cylinder. Cylinder valve is seat type, hand wheel operated. Hand wheel is held off the valve stem until the locking pin is removed to allow the hand

(Continued on page 292)

SLY PIONEERS & LEADERS
INDUSTRIAL DUST CONTROL

Widely Used... Not Expensive



Sly Dust Filter mounted over Sly Blast Room

You, too, may have a dust problem as did this foundry before the installation of Sly Dust Control.

Note how clean the foundry is now . . . a good place to work — *efficiently*. Men like the better working conditions and produce more.

The Sly Dust Filter (shown at left) handles the dust created by a Sly Blast Room, grinder booths, and surface grinders. *The cleaned air contains no visible dust.*

In these days of "*forced draft*" production, equipment which helps increase production is worth looking into. Sly is *not* expensive as thousands of installations prove.

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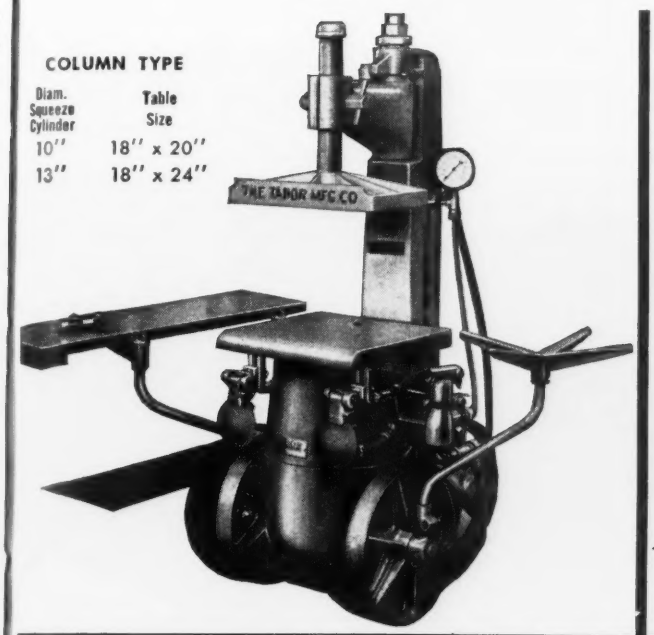
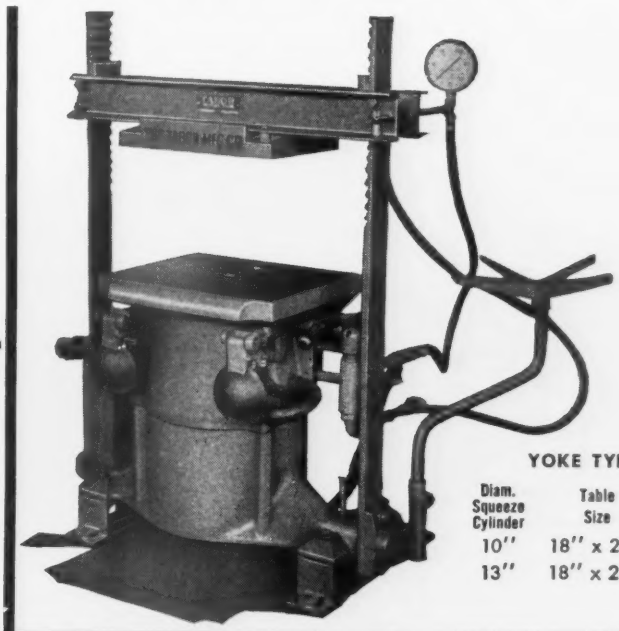
There's a Tabor Squeezer to fit the job!

COLUMN TYPE

Diam. Squeeze Cylinder	Table Size
10"	18" x 20"
13"	18" x 24"





YOKE TYPE

Diam. Squeeze Cylinder	Table Size	Space Between Uprights
10"	18" x 20"	32"
13"	18" x 24"	36"

TOP-SQUEEZE TYPE

Diam. Squeeze Cylinder	Table Size
10"	16" x 19"

(Also available in portable or portable sand-straddler types)

CANTILEVER TYPE

Diam. Squeeze Cylinder	Table Size
10"	18" x 20"
13"	18" x 24"

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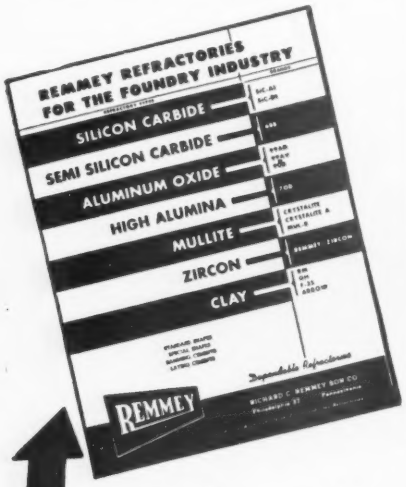

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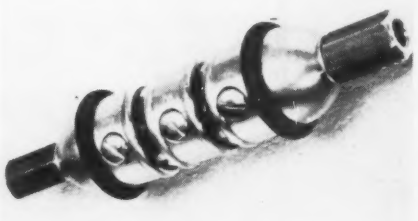
Manufacturers of Silicon Carbide, Mullite, Aluminum Oxide, Zircon and Clay Refractories

(*Continued from page* 290)

wheel to spring down and key itself to the stem. A squeeze-lever type valve on the discharge horn operates instantly with hand pressure and closes without loss of the reserve of gas when pressure on the lever is released. Discharge horn is equipped with an antistatic device to minimize static electricity and to insure safety in combating electrical blazes.

For More Details Circle No. 35—Page 278

Pneumatic Lubricator: Air Speed Tool Co., 1502 West Slauson Ave., Los Angeles 47—Oiler lubricates



pneumatic tools with "oiled air" at the same time it filters the line. Features include 12-oz Neoprene shock absorber "O" ring mountings that permit dragging the hose without damage and a nonbreakable, clear vision window that shows when the oil supply needs replenishing. Any good oil up to 30 SAE can be used. Fittings are adaptable to all standard sized air lines, and the device can be used on a stationary machine line. Basically constructed of aluminum, the lubricator has no moving working parts. Oil flow can be increased or decreased as desired, however, by a needle-point adjustment. Air by-passes the feeder outlet so that the line does not have to shut down to refill. Removing a plug, turning on air and blowing out dirt, scale, water, rubber particles and other tool-damaging accumulations cleans the filter section.

For More Details Circle No. 36—Page 278

Voltage Tester: Ideal Industries Inc., 1922 Park Ave., Sycamore, Ill.—Voltage tester shows nominal line voltages from 110 to 550 ac and 110 to 600 dc. It also distinguishes between alternating and direct current and shows polarity of dc lines. Prod handles are integrally molded to Neoprene-insulated leads and include tip insulation and safety rings. One-piece plastic case is completely enclosed. Lack of exposed metal parts on the exterior of the case prevents current from being carried from the working parts. Interior construction features a solenoid coil, layer wound on a one-piece nylon spool. A

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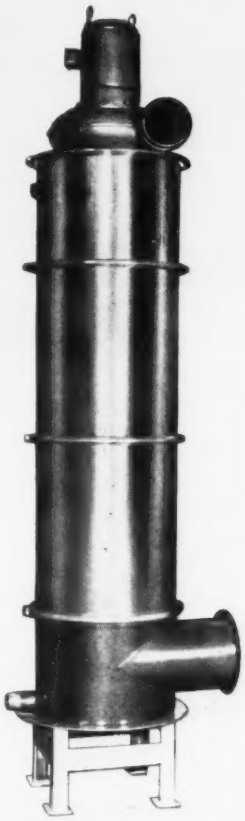
neon lamp in parallel with the solenoid provides a double check on circuits.

For More Details Circle No. 37—Page 278

Fume Washing Tower: Process Equipment Division, U. S. Stoneware Co., Akron, O.—Compact, portable fume washing tower is for general laboratory and industrial use. It consists of a metal stand for the tower; a bottom section containing a packing support plate, a liquor drain pipe and a fume intake duct; one, two or more packed intermediate sections; a distributor section with water inlet; and a top section containing the exhaust fan, drive motor and washed air duct. The unit is made in 20 and 30-in. tower diameters, which with two intermediate sections are 8 ft 5 in. and 9 ft 7 in. tall, respectively. Powered by a 1 and by a 2-hp motor, they have rated capacities of 750 and 1650 cfm of air. A 1/16-in. coating of plastic



protects all metal surfaces, inside and out. Washer can be used to wash dust as well as fumes from the air.

For More Details Circle No. 38—Page 278

Vises: Wilton Tool Mfg. Co., 925-941 Wrightwood Ave., Chicago 14—Drill press and machine vises in jaw widths of 3, 4½ and 6 in. are built to close tolerances and fitted with a precision-cut Acme spindle.

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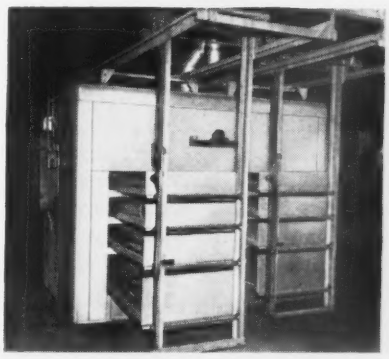
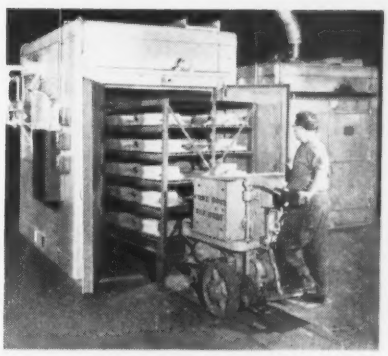
ENGINEERING ACHIEVEMENT
By

MICHIGAN OVEN COMPANY DETROIT MICHIGAN MOCO



ROLLER DRAWER OVEN



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it shows and describes MOCO's complete line of Foundry Ovens—and how they can *step-up efficiency* and *cut costs* for YOU.

CONVEYOR CORE OVEN

Maximum volume of recirculated air provides a new high in *temperature uniformity* — *faster baking*—*elimination of hot spots.* Heaters and fans are self-contained within the oven structure — eliminating heat losses and field insulation—and saving floor space.

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MICHIGAN OVEN COMPANY

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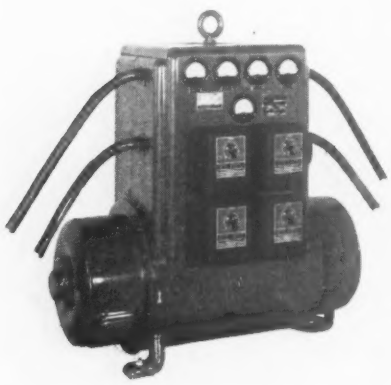
Main parts are gray iron. Because all sides are fully machined, vises can be used flat or on either side. Jaws have vertical and horizontal V-grooves to clamp rounds. Two slide bars are of heavy-gage, cold-rolled steel. Removable hardened steel jaw plates are available optionally. The 6-in. vise has a removable crank handle, and the 4½-in. model has a slide bar handle in addition to a hex-head for wrench tightening.

For More Details Circle No. 39—Page 278

Battery Charger: Motor Generator Corp., Troy, O.—Four-circuit monitor charger for six-cell lead-acid or ten-cell nickel-iron motorized hand truck batteries reportedly combines the efficiency and low maintenance cost per circuit of multiple circuit equipment with the compactness, simplicity and flexibility of single circuit units. Four charge controls, motor starting switch, motor and generator controls all are mounted in the monitor top control cabinet as an integral part of the motor-generator set. All components are readily accessible. Standard equipment includes four 10-ft charging cables. User need provide only a three-phase power supply and a suitable disconnect switch.



For More Details Circle No. 40—Page 278

Air Cylinder Hoist: Air Control Division, Lehigh Foundries Inc., 1500 Lehigh Drive, Easton, Pa.—Air cylinder hoist is designed for flexibility and safety in all types of materials handling. It is well adapted to precise load spotting and is shown here "inching" a heavy foundry flask cover into position. Presence of only one moving part cuts maintenance cost. Piston has sealed-in lubricator, self-lubricating bronze piston rod bushings and graphite-impregnated piston packings. Hoist is a bleeder type design, which enables operator to adjust movement very finely. Built-in check valve permits air line to be disconnected without disturbing positioning and permits hoist and its load to be moved from place to place without long air lines. Load can be lowered without reconnecting the line. Capacities from 100 to 3500 lb with lifting strokes ranging from 24 to 49 in. are available.

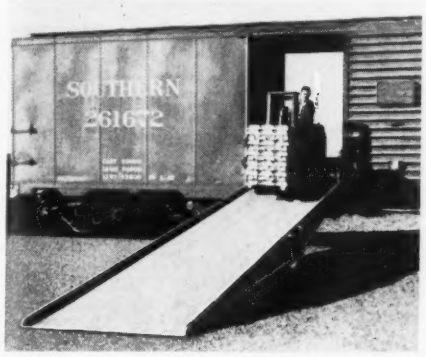
For More Details Circle No. 41—Page 278

Silicone Roof Coating: Monroe Co., 10703 Quebec Ave., Cleveland—Silicone-content roof coating that combines silicones with long fiber asbestos, asphalt and nonevaporating, waterproofing oils is said to produce

a more durable coating than is possible without the silicones. It saturates and preserves roofing felts and stays elastic and waterproof. Other improvements include greater resistance to oxidation and freedom from checking, cracking and sagging. Easily applied without heating, the material can be brushed or sprayed on surfaces of any size and is suitable for small roof repair jobs or for coating extensive roof areas. It comes in 5, 30 or 55-gal containers.

For More Details Circle No. 42—Page 278

Loading Dock: Magnesium Co. of America, East Chicago 19, Ind.—Magnesium, portable yard ramp rolls easily on two wheels and can be handled by one man. It permits loading or unloading freight cars from the ground where no dock facilities exist or where facilities are congested. Manufactured in five standard sizes with capacities ranging from 6000 to 16,000 lb, the ramp is 30 ft long.

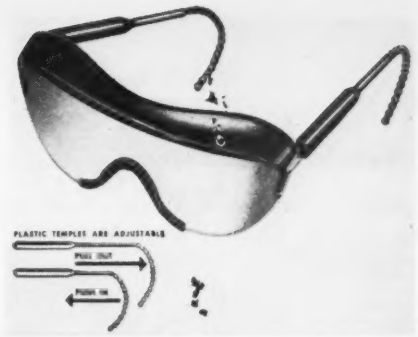


For More Details Circle No. 43—Page 278

Face Shields: American Optical Co., Southbridge, Mass.—Company has redesigned two series of face shields to give 5/8 in. more clearance between the wearer's face and the window, thus affording greater clearance to workers who must wear glasses or corrective goggles under face shields. Floating snap fasteners permit the window to expand under extreme heat without cracking or curling. Different types and sizes of windows are replaceable and interchangeable on the same headgear. Windows come in clear or green acetate in three sizes, with a choice of three thicknesses.

For More Details Circle No. 44—Page 278

Spectacles: Watchemoket Optical Co., Dept. N41, 232 West Exchange St., Providence 3, R. I. — Lightweight spectacles designed to give up to 90 per cent protection from eye hazards feature retractible, adjustable plastic temples and offer



three differently styled lenses: Regular side shield for average eye hazards; full 1-in. side shield for clear view side protection; and semi-cup lens for side and bottom protection. All lenses are made of shatterproof methyl methacrylate and are available clear or in light, medium and dark green tints. The plastic temples telescope in or out to any length desired and are said to stay comfortably in place once they have been adjusted.

For More Details Circle No. 45—Page 278

Pallet: Econoweld Corp., 515 Callahan Building, Dayton 2, O.—Steel and hardwood pallet is assembled entirely without fasteners. Steel members of the pallet consist of three tubular steel skid runners

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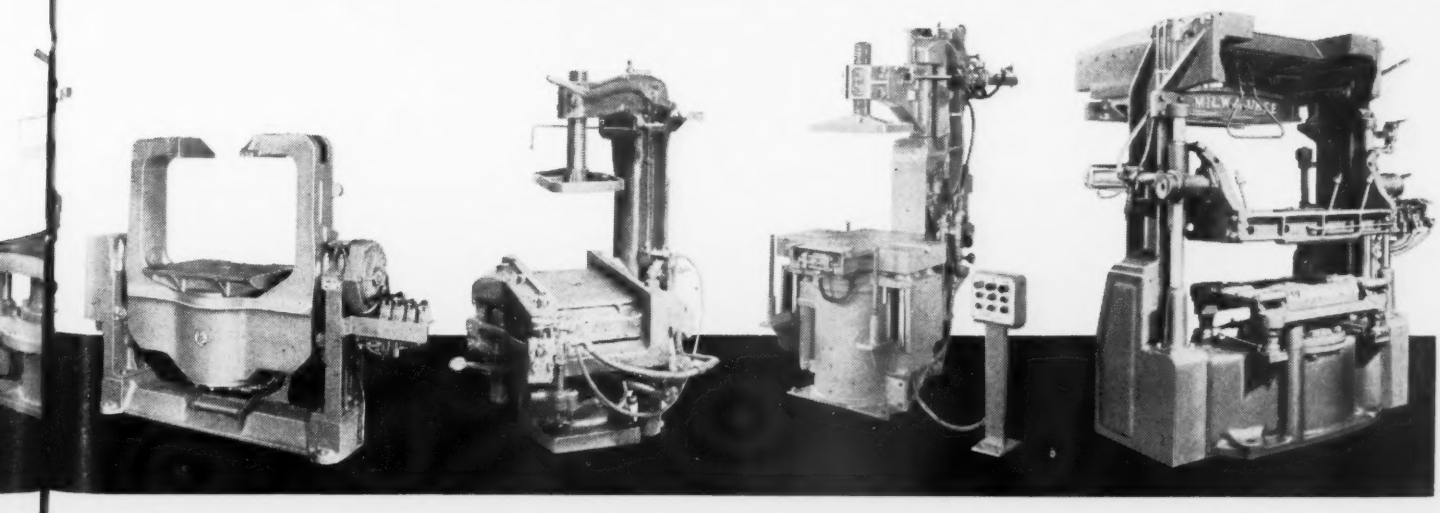
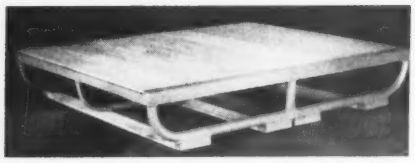




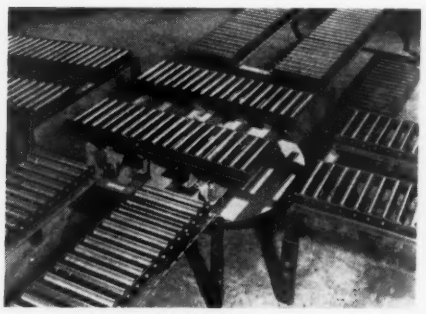
welded to a deck-retaining frame of angle iron which armors the hardwood deck. Deckboards are nested in the retaining frame and clamped in position by a keyboard spring lock. Boards reportedly can be removed and replaced in seconds, either by hand or with small hand tools. Bottom boards are individually secured by heavy gage steel containers welded to the skid runners and entirely encase and protect board ends.

For More Details Circle No. 46—Page 278

Line Burner: Eclipse Fuel Engineering Co., Rockford, Ill.—Gas-fired, retention type line burner for applications requiring that heat be distributed over a wide area by a continuous flame is said to be excellent for oven heating, kettle heating and air heating installations. Of blast burner design, it will operate with rich, neutral or lean mixtures at all mixture pressures and can be installed to fire either horizontally or vertically. They are made of cast iron sections with drilled ports and steel retention lips. Each section is equipped with drilled and matched flanges. An adapter flange is available for applying either blast or atmospheric pilot and flame failure protective equipment.

For More Details Circle No. 47—Page 278

Turntables: Sage Equipment Co., 31 Essex St., Buffalo 13—Turntables are reported to permit products being conveyed on straight sections of conveyors to be diverted at any angle or to pass straight across



the turntables. Roller or wheel conveyor sections are mounted on large casters that turn these sections on a circular, flat steel plate. A built-in lock arrangement rigidly holds the rotating section of these turntables at the desired angle. The turntables are designed and built for use with all widths of rollers, wheel arrangements, frames and couplings available in the company's standard line of roller and gravity wheel conveyors.

For More Details Circle No. 48—Page 278

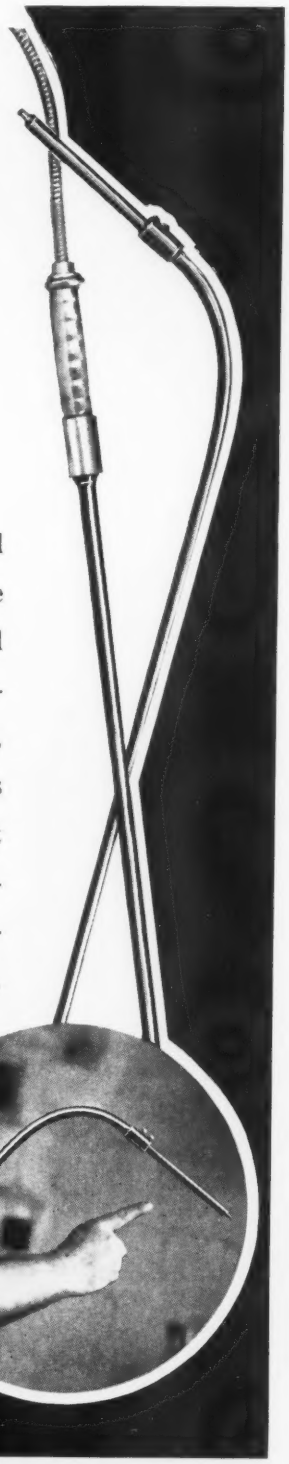
Thermocouple Head: Claud S. Gordon Co., 3000 South Wallace St., Chicago 16—Thermocouple head is designed for compactness and reduction of useless bulk and weight. Base and cap are made of malleable iron for extra strength and are cadmium plated for corrosion resistance. A friction-lock cap can be tightened or removed by a quarter turn. The connector block is of a heat resistant material specially selected to withstand, without damage, temperatures of 900°F in continuous service. An insert simplifies lead wire connections. Design of the thermocouple head permits easy removal of the complete thermocouple element, including the connector block. A choice of ½, ¾ and 1-in. IPS protecting tube opening is available.

For More Details Circle No. 49—Page 278

"It's too hot!"

"No, it's too cold!"

It is differing opinions like this that Marshall Enclosed-Tip Thermocouples remove from the nonferrous foundry! By the use of Marshall Thermocouples, the foundryman can tell exactly the temperature of his molten brass, bronze, aluminum or magnesium. He knows when his metals have reached the correct heat for pouring sound, dense, uniform castings. Write for descriptive data. L. H. Marshall Co. 270 W. Lane Ave., Columbus 2, Ohio.



Hot-junction tip of the thermocouple is protected against the action of hot metals and slag.

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In producing large castings, Truline Binder in the core mixes is especially beneficial. At Penn Steel Castings Company, Chester, Pa., for example, where cores often weigh two or three tons, the use of Truline Binder has resulted in important savings in time and increases in production.

Large cores, such as those shown here, are baked at 500°F. for eight to twelve hours. These Truline-bonded cores collapse easily—even where metal sections vary in thickness from one and one-half inches to eight inches. And castings are cleaner, smoother, and sounder.

From baking oven to cleaning room, for iron as well as steel castings, Truline Binder can help speed production for you. Our foundry service men will be glad to show you how. Write Hercules today for details.

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Checker measures dimensions of one of the cores used in casting shown below. Truline Binder in the mix permits Penn Steel to bake cores satisfactorily in eight to twelve hours at 500°F.

Truline-bonded cores such as this collapse easier—even where thicknesses of metal sections vary from one and one-half inches to eight inches. Result: cleaner and better castings.

The Truline-bonded cores in this 58,000-pound Penn Steel casting required a minimum of labor to remove.

NF53-4

Drops Cupola Bottom

(*Continued from page* 125)

information without interfering with daily production, a small experimental cupola was constructed. Water segments were installed, and from the data obtained the large production cupola was converted to water cooling as indicated in the accompanying cross-sectional view. When that change was made the internal diameter was increased from 28 to 36 in. Cooling zone begins 20 in. above the bottom plate of the cupola and extends 48 in. upward. It is composed of 25 three-in. diam seamless tubes equally spaced on a 42-in. circle. Tubes are welded into a header of rectangular shape 8 in. high and 5 in. wide, at the bottom, and into a 5-in. diam circular header at the top. Four equally spaced water inlets and outlets are attached to the headers. Inlets and outlets in turn are attached to manifolds. Tuyeres formed of 5-in. diameter steel tubes, lined with refractory material 1¼ in. thick, pass through the lower header at an angle of 10 degrees with the horizontal plane.

Inlet manifold is connected to the bottom of a 5000-gallon water storage tank elevated about 6 ft. above the floor level. The outlet manifold is attached to a heat exchanger unit mounted on the roof. Air for the cupola blast passes through the exchanger, and its temperature is raised to about 190° F. Water circulation through the cooling system is by gravity. Inlet temperature of the water is 206° and the outlet temperature 212° F. In the winter time part of the outlet water is circulated through the plant heating system to keep the foundry and office at suitable temperatures.

Lower portion of the cupola from the bottom plate to the water cooled section, or a distance of 20 in., is one layer of basic brick backed by firebrick against the shell. Lining at the water-cooled section is monolithic type mortar composed at present of crushed basic slag, magnesian lime and portland cement, and is 1½ in. thick over the tubes on the interior face when first installed. However, in operation the lining thickness may vary from practically nothing up to 1½ in. depending upon the volume and chemical composition of the cupola slag. The greater the volume of slag used, the greater the adherence to the water-cooled tube segments, but not over the stated 1½ in.

Lining Has Long Life

Lining above the water-cooled section is firebrick. Present lining has been in operation for over 12 months with only minor repairs at the week end amounting to 84 cents a ton of metal melted for labor and materials.

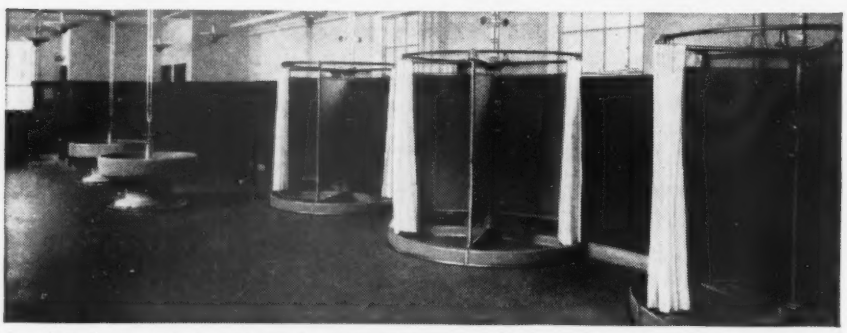
Iron to coke ratio in melting is 8:1. Iron charges weigh 500 lb and are composed of 40 per cent pig iron containing 2.75 to 2.85 per cent Si; 10 per cent steel scrap; 25 per cent purchased stoveplate scrap and 25 per cent return scrap. Dolomite equal to 6 per cent of the metal weight is used as a flux. Iron over the spout shows about 2.20 per cent Si, 0.70 per cent Mn, under 0.15 per cent P, and under 0.10 per cent S. With other than stoveplate scrap the S does not exceed 0.05 per cent. Cupola bed is 48 in. high. Present melting rate is 1¾-ton an hour for 8 hr per day to meet production requirements.

Control of the iron is maintained by chill tests at the spout every hour as well as slag checks. Chill test uses the step bar shown in the accompanying sketch and is poured in green sand. Control is based on the

(*Continued on page* 300)

With Bradleys like this, washing time is reduced. (Pre-Cast Stone Model)

And women as well as men enjoy the sanitary features. (Stainless Steel Model)



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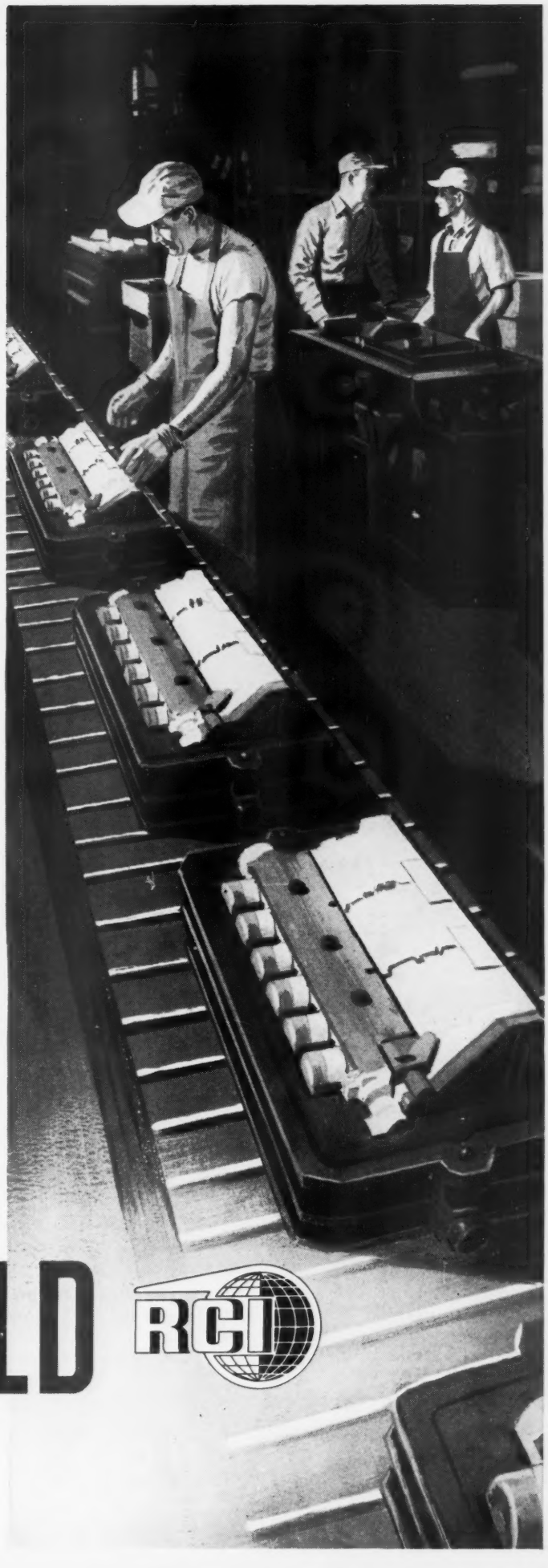

Gamma rays.....
unexposed film.....
steel casting.....

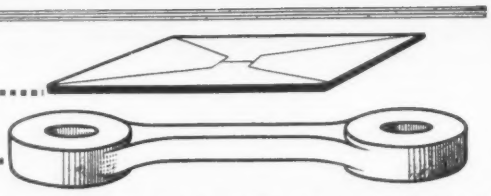

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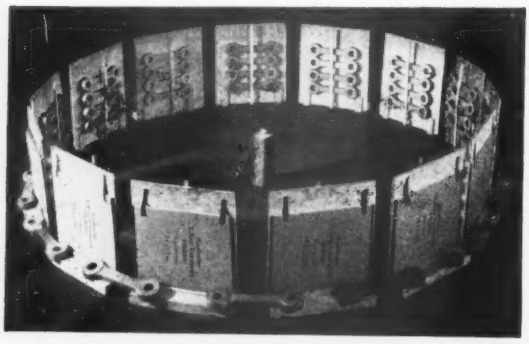
Illustration shows 60 steel castings being photographed simultaneously. The gamma rays, flying in all directions, go through all the castings at once, making 60 exposures of the 60 castings



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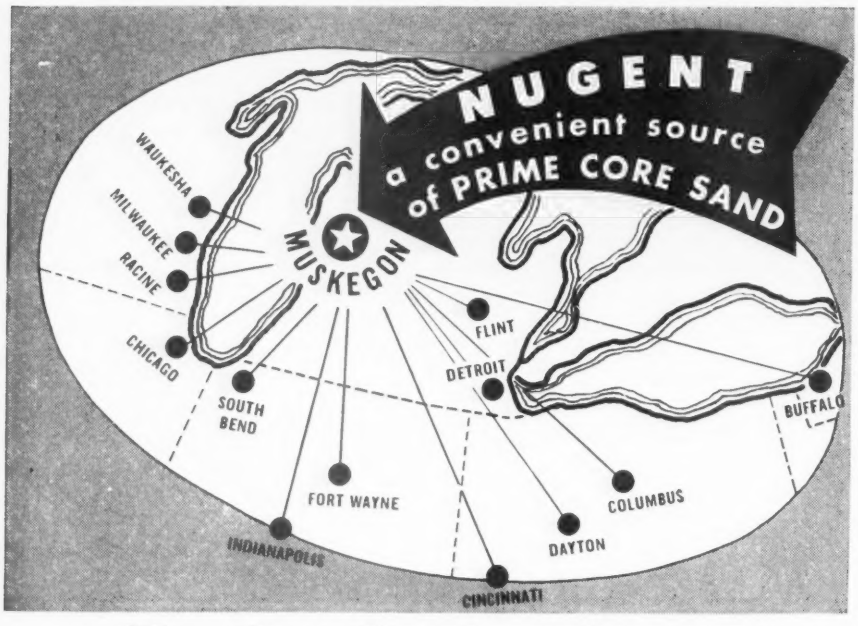

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THE NUGENT SAND COMPANY, INC. MUSKEGON, MICHIGAN

(*Continued from page* 298)

chill shown in the thin section which is broken off at about ¼-in. increments beginning at the tip. When the chill does not extend beyond the first quarter inch, brinell hardness number of the castings averages 187. If the chill does not extend beyond the second quarter inch, brinell hardness of the castings averages 197. Chill in the third quarter inch shows a brinell of 207 in the castings, and chill in the fourth quarter inch indicates a brinell hardness of 228. Brinell hardness readings also are made on the castings at the abrasive blast machine every half hour.

Slag control is maintained by a color comparison method wherein the slag is ground into powder and placed in distilled water to which some phenolphthalein indicator is added. Depth of the red color developed by the slag is compared with color standards prepared from slags of known basicity.

Cupola Has Conical Bottom

Although worthwhile measure of success had been obtained in translating previous experimental work with the small cupola to the production cupola, the thought that further improvement might be attained still persisted. After consideration of various possibilities, the cupola shown in the accompanying sketch, and termed the "bottom melting furnace," was developed. As may be observed, the unit has a conical bottom which slopes 35 degrees from the horizontal, and a baffled windbox extending 48 in. upward from the bottom support ring.

Inside diameter of the furnace is lined to 18 in. Water-cooled vertical section is 24 in., and as in the case of the production cupola, cooling segment is composed of steel tubes connected to top and bottom headers. In addition to cooling segments in the side wall, the conical bottom also is water-cooled with plate-type segments. Water-cooled bottom and sidewall are lined with rammed monolithic refractory composed of basic slag, magnesian lime and portland cement. Bottom thickness is about 3 in., and sidewall thickness is about $1\frac{1}{2}$ in. if desired.

As may be observed in the illustration the tuyeres slope down at approximately the same angle as the bottom, and as in the case of the production cupola, pass through the lower header of the cooling segment. Taphole at the apex of the conical bottom is about 2 in. in diameter and remains open during the entire melting operation.

Lining above the water-cooled ver-

tcal section is composed of fire-brick and is 2½ in. thick. That lining extends to the top of the windbox section. Remainder of the stack is lined with 4½-in. cupola block. Thin lining at the windbox section in combination with the baffling in the windbox is said to permit raising the blast temperature to around 350° F.

Melting rate of the furnace is over 1 ton an hour. Molten metal and slag flowing through the bottom taphole is caught in a 250-lb teapot-spout, holding ladle mounted on trunnions beneath the furnace. That arrangement permits tilting the ladle forward to discharge molten metal into pouring ladles, or backward for the removal of slag as conditions demand.

It is claimed that the combination of the various features of the furnace such as preheated blast, sloping tuyeres, continuous bottom flow of metal and slag with ejection of some gases of combustion, etc., result in iron temperatures about 100° F higher than in the case of conventional cupolas. By proper selection of raw materials charged into the furnace, low carbon irons suitable for malleablizing, or higher carbon irons suitable for production of gray iron castings may be produced. Development work on the bottom melting furnace is being conducted by the recently formed Melting Research Inc., Bettsville, O.

Film Shows Investment Casting Process

A step-by-step, color movie demonstration of how investment parts are mass produced has been prepared by Microcast Division, Austenal Laboratories Inc. Entitled "Microcast—A Story of Industrial Progress," the 22-minute, 16-mm film explains the company's process for producing what are said to be virtually nonmachinable, high-temperature alloy castings.

The company first used the process in 1929 to produce dental and surgical appliances. Later it was adapted to the production of power blades and buckets for B-17 and B-24 turbochargers and since World War II it has been used for making power blading for centrifugal and axial flow type jet engines as well as for nonmilitary items.

Available without charge, the movie is meant to be of special interest to design and production engineers, engineering societies and graduate engineering students. Information can be had from Microcast Division, Austenal Laboratories, Inc., 244 East 39th St., New York 16.

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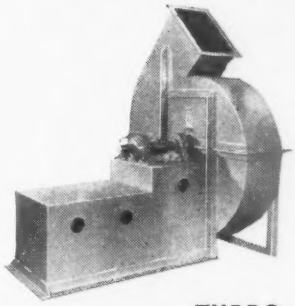

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GENERAL High-duty pressure Fans are recognized by engineers and contractors for meeting medium and large air volume requirements at high velocities for cupolas, blast furnaces, crucibles and small cupolas.

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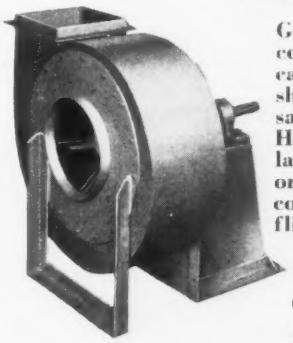

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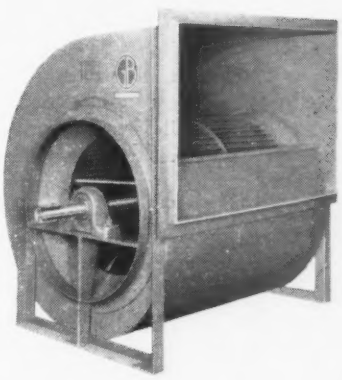

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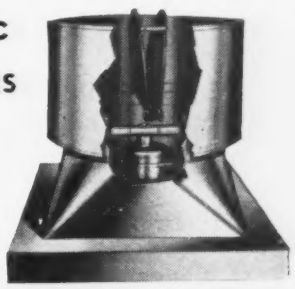

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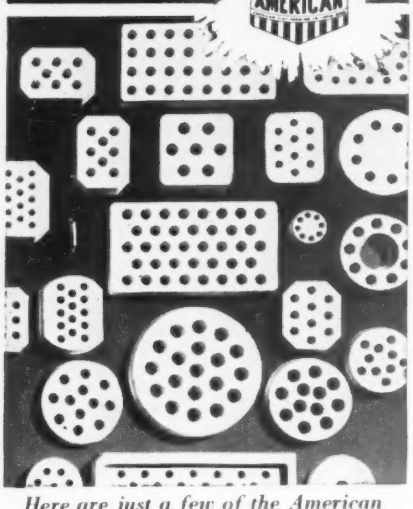

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Gray Iron Stress Relief

(*Continued from page* 131)

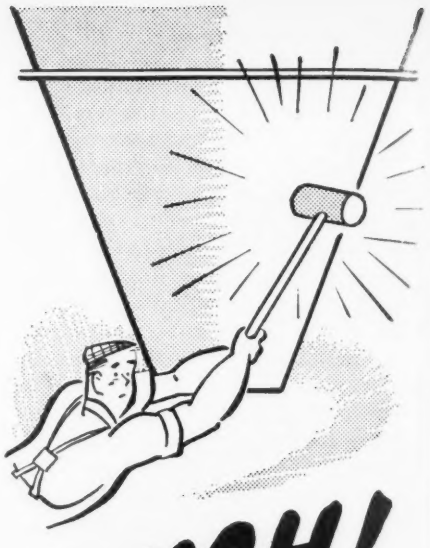
to not more than 550°F before being allowed to air cool; in the case of castings of intricate design, it even may be advisable to continue the furnace cooling until a temperature of about 200°F has been reached.[3, 15] Most commercial furnaces cool down slowly enough to meet all requirements automatically.

A tentative ASTM Specification, A278-49T, covering gray iron castings for pressure-containing parts for temperatures up to 650°F, requires that after the stress relieving heat treatment, the cooling rate "shall not be more than 400°F per hour divided by the maximum thickness in inches for thicker castings.[15]" This rate can be considered satisfactory for the most intricate castings.

Influence of Degree of Initial Stress—It has been determined[9, 10] that, at a given stress relieving temperature, the greater the original stress in the casting, the greater will be the rate of stress relief. As a consequence, degree of initial stress is not a significant factor. However, in no case did a casting with greater original stress reach within a given time an internal stress level quite as low as that of a casting with an originally lower initial stress; see Figs. 8 and 13.

Weathering — Weathering — the process of leaving the casting for several months either in the open or in storage—has been used with the purpose of relieving internal stress. However, tests[9, 10] have shown that at a maximum a stress relief of 10 per cent can be attained by this process. The small proportion of stresses removed does not in general justify tying up a large investment in castings for the prolonged length of time necessary. It has also been shown[9] that the temperature oscillations of the weather (which were thought to cause considerable stress relief during weathering) have only a negligible effect, since the artificial application of four-hour temperature cycles between 0 and 220°F relieved only 17 per cent of the internal stresses in a plain gray iron.

Examples of Stress Relieving Treatment—The stress relief of gray iron is a process widely employed in industry. In fact, it is the most common form of heat treatment. This first was demonstrated by a survey of British foundries. It has been confirmed by a recent survey by the Gray Iron Founders' Society. Of 96 foundries which reported that they carry on some kind of heat treatment, 73 reported use of heat treat-



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ment for stress relief, 66 reported heat treating for improved machinability, 30 used it for improved wear resistance, and only 8 for increased strength.

The curve in Fig. 14 plotted from data obtained in this survey shows stress relief temperatures actually employed in practice on the basis of the frequency of their application. It will be noted that the majority employ temperatures of 1000 to 1100°F, which is within the recommended range shown in Table I for plain and low alloy irons. Lower temperatures sometimes are used where the degree of stress relief needed is not so great or facilities for slow cooling from the stress-relieving temperature are not available.

When temperatures reach 1150°F or above, in addition to stress relief, partial structural changes normally take place, softening the irons and improving machinability. Foundries using such high temperatures presumably feel that in their particular cases such alterations in properties are permissible or desirable.

Some idea of the types of castings that have been stress relieved successfully in actual practice is given by Table II. The list was drawn from the same survey of members.

Obviously, the necessity for stress relieving will depend on the application, and it is of interest that up to the present the majority of gray iron castings have been used successfully directly as cast without any stress relief treatment. However, with the increasing tendency to select higher strength irons to meet increased working loads, the necessity for stress relief becomes progressively greater. The desirability of stress relieving castings in critical applications should, therefore, be kept in mind and the treatment applied wherever the service justifies its cost.

TABLE I — Recommended Stress Relieving Temperatures

Type of Gray Iron	Temperature of Stress Relief
Unalloyed	950—1050° F
Low alloy	1050—1100° F
High alloy	1100—1200° F

TABLE II—Types of Castings Submitted to Stress Relief

Air compressor cylinders and heads, ball bearing housings, brake drums and wheels, bedbars, crankcases, crankshafts, clutch plates, cutter head slides, cylinder sleeves.

Diesel and gas engine castings, distributor and starter castings, drawing dies, gears, generator castings, governor parts, hydraulic cylinders, knitting machine beams.

Lawn mower knife bars, light machinery castings, machine tool castings, nodular iron castings, paper mill castings, pillow blocks, pistons, precision spindle castings, pressure vessel discs, protractor bodies and dials, pump and motor castings, punches.

Refrigerator compressors, sewing machine parts, textile machinery castings, turbine castings, valve castings.

Bibliography

1. A. LeThomas, "Stress Relieved Cast Irons," *Foundry Trade Journal*, V. 62, Mar.

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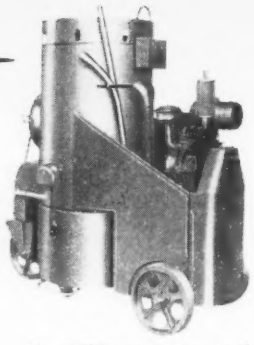

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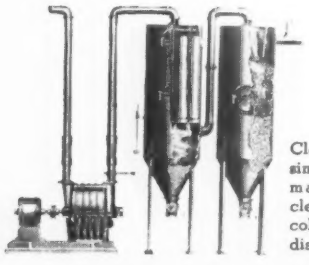

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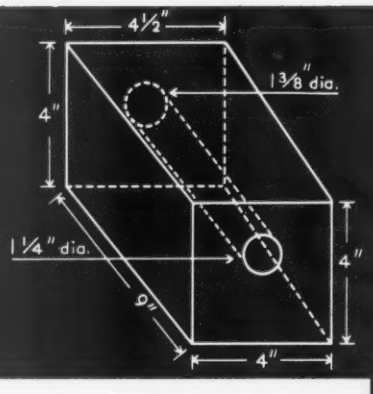
How to eliminate slag hole failures



Operators of continuous pour cupolas report 20 or more hours steady service from CARBOFRAX silicon carbide blocks —with practically no change in hole size. Result: no slag hole failures, no costly shutdowns.

Get a trial order of these durable blocks. The standard size shown is available for immediate shipment. Other sizes can be made from stock molds. Further details gladly furnished. Address Dept. V-93.

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Directory Lists British Iron and Steel Firms

Seventh edition of *Iron & Steel Directory* contains revised lists of British pig iron manufacturers and of some 2500 iron and steel founders and steelworks, arranged both geographically and alphabetically. A list of British iron and steel groups gives the names of their associated or subsidiary companies. Other lists include the names and addresses of iron and steel trades associations; engineering, scientific and technical societies, and insitiutions, with the names of their secretaries.

The book also contains a large amount of technical data for engineers, metallurgists and other persons and organizations making or using iron and steel. The final section comprises a classified list, with addresses, of manufacturers engaged in the iron, steel and allied trades.

Sand In Their Shoes

(*Continued from page* 127)

mold was dried in an oven for hours, or even days, depending on the amount of sand to be dried. This baking process tied up a great deal of equipment.

But the worst feature arose from the fact that steel shrinks nearly one-quarter inch in every foot, while cooling. This caused difficulties. If the product happened to be a complicated shape containing elongated thin sections joining two heavier sections, the contracting metal encountered too much resistance from the hard-baked sand. Since the sand wouldn't give, there was nothing for the metal to do but tear apart as it shrank. This was what limited the variety of products you could cast. It was what made McRoberts shake his head in doubt when he had looked at the wheel patterns.

Green Sand Permits Yielding

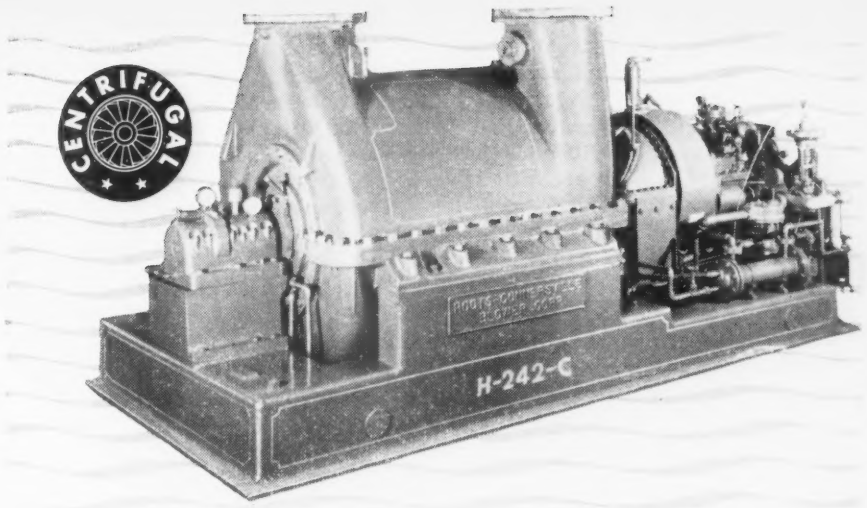
Green sand seemed to correct the difficulty. For a green sand mold, made of a mixture of sand, clay and binders, while firm enough to hold its shape, was far from brick-hard. As the metal cooled, the sand yielded sufficiently to the shrinking steel to allow the product to hold together. To Goltra and McRoberts, this fact lifted the horizon for cast steel. It opened the curtain on a dazzling new field of opportunity, and their enthusiasm can be imagined. They lost no time taking advantage of it.

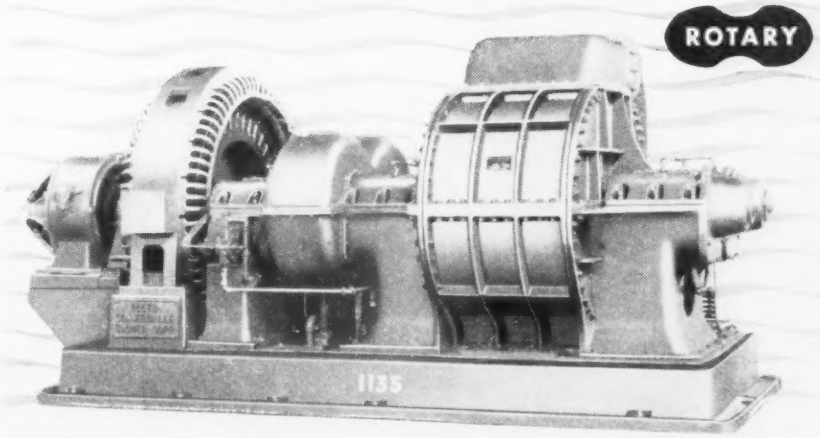
Goltra went to his friend Rolla Wells, the St. Louis traction magnate, told him of the possibilities, and suggested that Wells finance a new cast-steel foundry.

But Wells had to be shown, and he said in effect: "If you can convince me in a practical demonstration that a sound basic steel casting can be made in a green sand mold, I'll consider your proposition."

Goltra decided that the demonstration might as well be dramatic. The year was 1893, and on the shores of Lake Michigan Chicago was enjoying the Columbian Exposition with its brilliant display of electric lights, the first giant Ferris Wheel the world had seen, fine displays of new machinery for industry, a roaring Midway, and the wiggling dancer known as Little Egypt. There was also on display at Chicago a locomotive frame of cast steel exhibited by Krupp. American foundries had yet to cast satisfactory locomotive frames.

The spirit of the day was one of challenge and nowhere was the spirit more evident than in Chicago. Goltra sent McRoberts to Chicago





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BLOWER BUILDERS SINCE 1854

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with the necessary patterns, cores and flask to ram up a mold for a railway truck bolster, and arranged for space in a South Chicago foundry, not far from the World's Fair. Then he suggested to Rolla Wells that they visit the Fair and at the same time look at a green sand demonstration.

Wells recalls the event in his biography. As Wells and Goltra left the Auditorium Hotel on Michigan Avenue to take the Illinois Central to South Chicago they were joined by an inquisitive and highly skeptical Pennsylvania foundryman.

"It's a fool's errand," this man said privately to Wells. "It can't be done, you know."

"I know," Wells agreed. "But I've gone this far. I might as well see it through."

On the casting floor of the foundry, McRoberts and a molder rammed up a mold. They did it in the presence of the three visitors so that they could be sure it was made of green sand. The ladle was swung over the mold and the nozzle placed in position for pouring.

"I'm getting out of here," said the Pennsylvanian and retreated to the protection of an iron pillar about a hundred feet away. Wells hesitated, decided that caution was the better part of valor and followed. Everyone but Goltra and McRoberts stampeded.

Once again the hot steel ran into the mold and there were no fireworks. The Pennsylvanian suspected a trick. He said the casting was bound to be no good.

The next day, all hands returned to the foundry, measured the bolster, broke it in two, and found it sound of texture and satisfactory in shape.

With this demonstration, all doubts disappeared. The party returned to St. Louis and in due time James G. McRoberts was granted patent number 504,361, filed on July 8, 1893, and issued Sept. 5, 1893, covering certain green sand processes for casting steel.

The new plant was located in Granite City, Ill., on level bottom land across the river from St. Louis. Its name was American Steel Foundry Co. It was incorporated Apr. 5, 1894, under the laws of Illinois, and ground was broken on a 24½ acre site on June 15.

Use Green Sand Process

The first buildings erected were a main foundry building 300 x 80 feet and two 40-foot lean-tos. The foundry was equipped with two overhead cranes, both bought from the Chicago World's Fair. The company's earliest products were railroad bolsters and couplers, both made of "basic" steel poured into green sand molds.

Men recall those early days at Granite City with a sense of wonderment. They can hardly believe that conditions were so primitive. There were so few rooming facilities in the town that half the force lived in a "hotel" on the plant grounds, sleeping in shifts, and thinking nothing of being called out in the middle of the night to "save a heat."

Times were depressed. Labor received 75 cents for a ten-hour day. Bricklayers received 20 cents an hour and laid 2500 bricks in a day. Carpenters earned 12½ cents an hour and molders $1.25 a day.

Thus was born what today is the largest foundry unit in American Steel Foundries, the Granite City plant.

American Steel Foundries began at other places besides Granite City.

It began also at Chester, Pa., not far from where William Penn first landed on American soil to take possession of the grant of Pennsylvania

(*Continued on page* 308)

Beat Up Hoppers Cost You Time and Money!

GET FREE-FLOWING, NON-STICKING SAND FROM ANY MIX

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MABCO Release Agent "G"

At Last M. A. Bell Company has developed a sure-fire method of freeing sticky core and molding sand in your hoppers. Only one-quarter pound of MABCO Release Agent "G" is required to eliminate stickiness in 100 pounds of sand.

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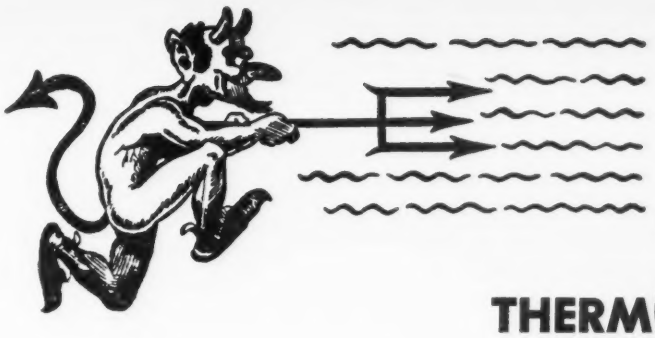

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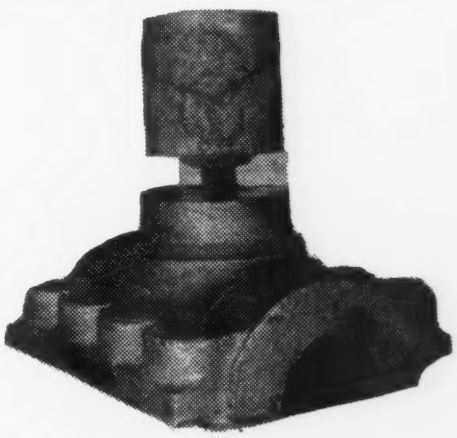
Keeps metal molten!

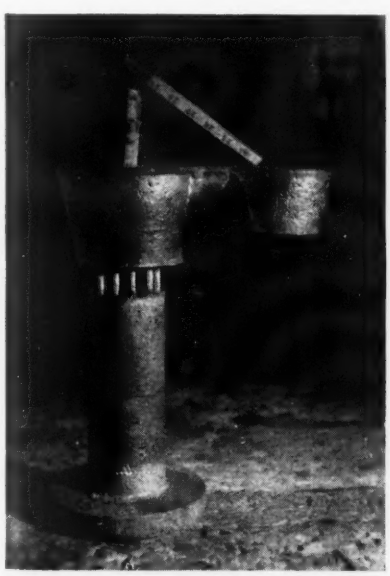
. . . for Steel, Iron, Aluminum, Brass, Bronze, Copper

THERMOTOMIC "X" is a patented exothermic compound that produces a temperature over 3500° F. It can be molded or baked into any desired shape the same as sand cores. THERMOTOMIC "X" is used as knock off core rings with 1½ inch feeder openings under risers of feeding heads, also as insulating sleeves, inserts and facings, or mixed with facing sand where it is desired to maintain fluidity of the casting metal. Shorter and more compact heads and risers can be used. The small feeder opening permits easy removal of feeding heads and risers. In conjunction with THERMOTOMIC COMPOUNDS, we recommend the use of exothermic CARBON FREE LIQUIDIZER NO. 5 on top of the metal in the heads or risers as an insulating cover. For green sand casting molds, use THERMOTOMIC WP (Waterproof).

U. S. Patents No. 2,490,327 and No. 2,500,097

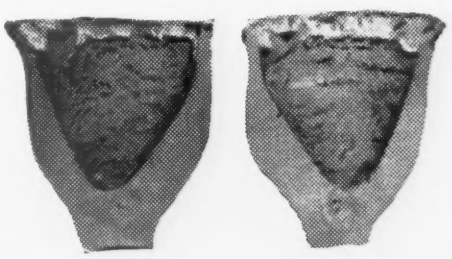


300 lb. aluminum bronze bearing cap cast with THERMOTOMIC feeding ring core under riser. Note small feeder opening which facilitates removal of riser from casting, resulting in greatly reduced cleaning costs.



THERMOTOMIC STRAINER CORE

Produces Monel Casting 270 lbs. solid



Made by direct pouring through the Thermotomic strainer core under the feeding head.

No chills were used, no shrinkage at the flange. Note depth of shrinkage in the feeding head.

NOTE THESE TYPICAL RESULTS FROM THE USE OF SOFFEL'S CARBON FREE LIQUIDIZER

With the application of 1 pound of SOFFEL'S CARBON FREE LIQUIDIZER, this 6" x 6" chrome-nickel-steel riser was reduced in weight from 32 pounds to 13 pounds average. A savings of 19 pounds of salable metal, normally discarded as scrap, was fed into the casting and produced a heavier, sounder casting. Note the feeding head can be knocked off easily, saving burning costs. There is no better feeding head compound at any price than SOFFEL'S CARBON FREE LIQUIDIZER.

BEWARE OF IMITATIONS! We are the originators of CARBON FREE LIQUIDIZER and THERMOTOMIC COMPOUNDS

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AT THE END OF THE LINE . . .

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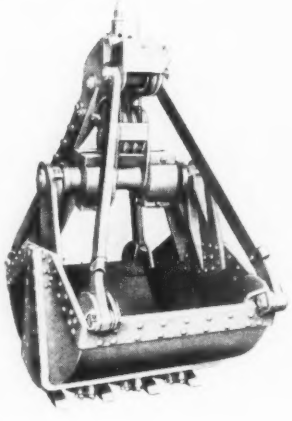
To be sure you have the right bucket for the job, let our field engineers look over your set-up. There's no charge, and their recommendations will help you get the most out of a major investment.



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Anderson Pattern Inc.
MUSKEGON MICHIGAN

ANDERSON is the Answer to your Pattern Problems

When you are looking for production pattern equipment which is machined all-over and engineered to fit the needs of your foundry.

Write or Phone for Further Information

Established 1931

(*Continued from page* 306)

in the name of Charles II. Here a plant was built in 1882 to manufacture castings from crucible steel. Before long an acid open-hearth furnace was installed.

From its earliest days, this plant, the Thurlow Works, gained a reputation as a plant that would try anything. In 1887, Congress lent official encouragement to the youthful cast-steel industry by authorizing the casting of a number of 6-inch breech-loading rifles to weigh 11,000 pounds. No steel casting that big had ever been attempted in this country.

Two guns were cast, one from bessemer steel, and one by Thurlow from open-hearth steel. Both guns were to be tested by firing ten service charges.

The bessemer gun failed on the second shot. The Thurlow gun successfully withstood the test of ten shots, but when the ordnance inspectors checked dimensions with their instruments they found that the bore had become slightly enlarged. By a narrow margin it failed of acceptance, but it was taken back to Chester and mounted in the yard of the plant, a monument to a courageous attempt to expand the uses of cast steel.

Casts Locomotive Frames

In 1893, Thurlow was first again. Stimulated by the example of the Krupp locomotive frame on exhibit at the Chicago World's Fair, Thurlow successfully cast a number of rear frames for Rock Island switch engines and later a complete frame for a Baldwin locomotive.

With the passing years it gained a reputation for turning out large and difficult items such as ship anchors, stern posts for battleships, and large industrial housings.

During the years it underwent several corporate names, but at the time of its assimilation by American Steel Foundries it was part of a combination of foundries known as the American Steel Casting Co. Its president was Dan Eagan, a practical foundryman whose experience with hot metal dated back to 1874.

One contemporary historian, reporting on the reputation of Thurlow early in 1900, wrote: "If no other plant can make it, send it to Thurlow."

American Steel Foundries began as well in Englewood on the outskirts of Chicago, in the foundry owned by George M. Sargent on West 59th and Wallace.

Here, in the 1890's, J. C. Davis was plant superintendent, a big man with a prominent nose, thrust-out chin and the studiousness of a research

engineer. At the time, he and his chemist, George T. Dougherty, were working out a unique idea in the casting of car wheels. They were pouring the molten steel into a whirling, or centrifugal mold, and dropping in a quantity of powdered ferromanganese during the first part of the pouring.

As the mold revolved they figured that the alloyed metal would be forced out to the rim, thus hardening the tread of the wheel but leaving the center tough and machinable. This was the beginning of the Davis steel wheel, which was to enjoy a long generation of popularity on the railroads of the country. It was also the beginning of the art of centrifugal casting, which finds a variety of uses today.

The Sargent Co. helped overcome the skepticism that hovered over steel castings in the 1870's. At one time they received an order for cast-steel gears to be used for the underground cable system of the Chicago Street Railways. So doubtful was the customer that the Sargent Co. had to post a $100,000 bond for the performance of the gears. The bond was never forfeited, because the cast-steel gears proved more satisfactory than the cast-iron gears previously used.

* * *

American Steel Foundries had its beginnings in Alliance, O., where some gentlemen by the names of Thomas R. Morgan, S. J. Williams, J. B. Kole and S. T. Wellman organized and built the Solid Steel Co. in 1882, the same year the Thurlow Works were built.

Ten years later, the Alliance plant, along with the Thurlow Works and other plants, was made a part of Dan Eagan's American Steel Casting Co., and was to continue under that banner until the entire combine was absorbed by ASF in 1902.

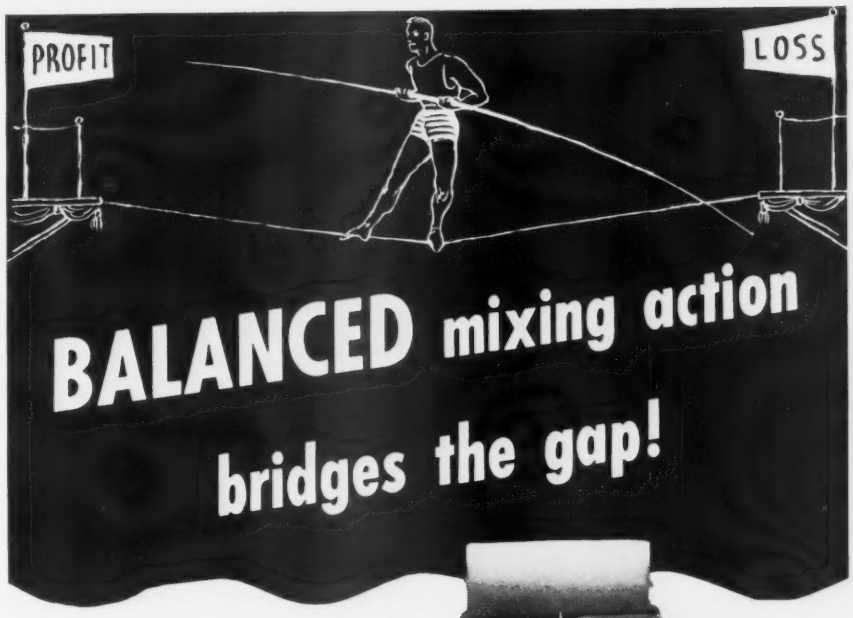
American Steel Foundries had its beginnings in Sharon, Pa., where Dan Eagan had built his first plant for casting steel.

It had its start at Franklin, Pa., where the Franklin Steel Casting Co. was operating.

A part of its beginning may be found in Pittsburgh, where a group of young men had organized the Reliance Steel Casting Co. in 1889, building a fine, modern shop equipped with a 10-ton traveling crane.

An important part of the corporation's origins are located in East St. Louis, where the Leighton & Howard Steel Co. began its life in 1900.

The parent of Leighton & Howard was the old Schickle, Harrison &



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The "Lancaster" system is unique. It will pay you to learn more about it. Write today for Bulletin 70. No obligation.

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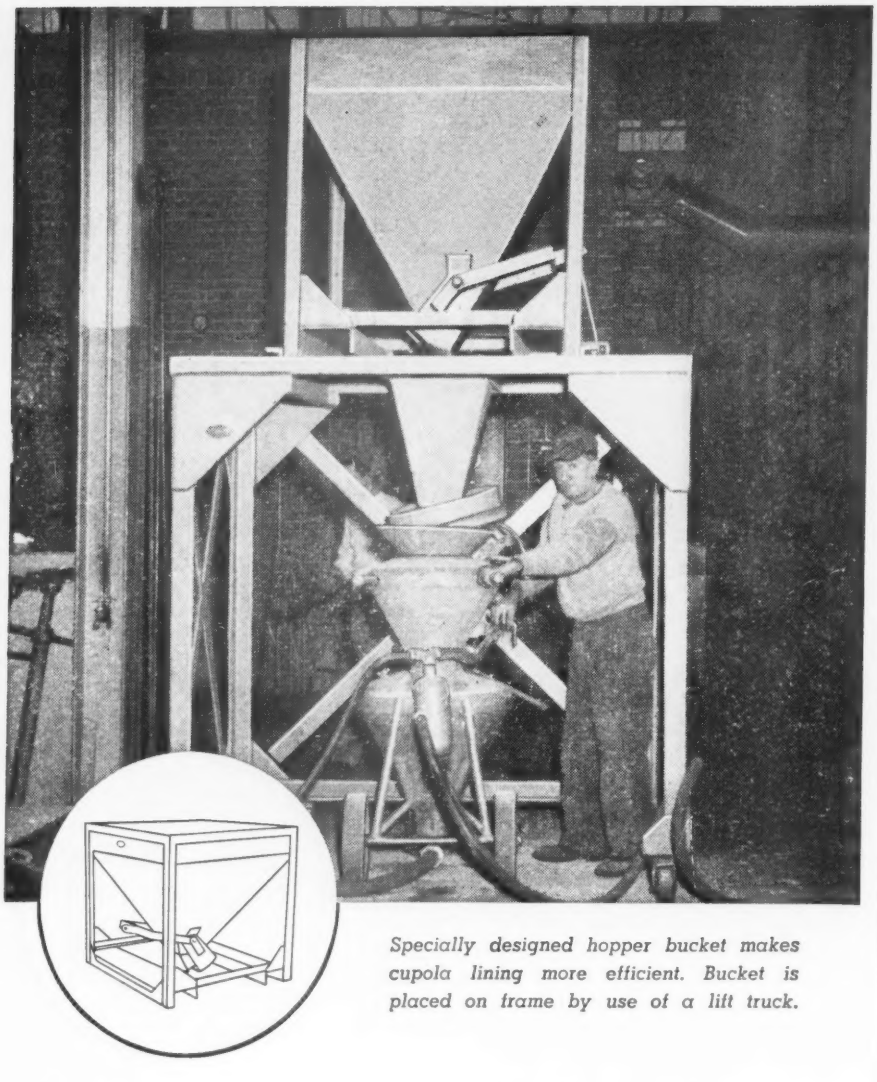

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In lining cupolas, Textile Machine Works foundry in Reading, Pennsylvania, had difficulty handling the clay mix used with their Bondactor equipment. After a study of the problem, Penn Iron Works, Inc., designed, engineered and manufactured this special hopper bucket for maximum handling efficiency.

Whatever the bulk-material handling problem in your plant, Penn Iron Works, Inc., will be glad to help with its solution. Our wide experience in designing and manufacturing all types of buckets and special handling equipment for foundries can help you cut costs . . . save time . . . increase efficiency.

For Further Information Write:

PENN IRON WORKS, INC.
READING, PENNSYLVANIA

Howard Iron Co. of St. Louis, a foundry that fairly represented the state of the art in the 1890's. Alfred Walcher, later to become a vice president of American Steel Foundries, who worked there in the 1890's, has described it vividly:

The buildings were of wood, occupying the equivalent of four city blocks, and the fire hazard was a constant threat. There were no lunch counters, washrooms, or dispensaries. Horse-drawn drays hauled materials to and from the plant. Molds were rammed by hand. The cranes in the shop were mechanical—a long shaft ran the length of the foundry and power was taken off this shaft for the cranes. The operator in the cab had to swing big levers by brute strength, in order to throw in clutches to operate the crane, and it took a 200-pound husky to survive a day's work. The murk of slag dust, coke dust and sand was like a London fog. In the pattern shop of this plant, Al Walcher, son of a Swiss locksmith, learned the trade of patternmaker.

The Schickle, Harrison & Howard Co. had equipment to manufacture a limited tonnage of steel castings, but the demand was so great that expansion was in order. A part of the ownership wanted to expand in St. Louis proper, and another part wanted to move across the river to East St. Louis. The two factions couldn't come to terms so they agreed to disagree. Old Tom Howard and George B. Leighton gathered up their assets and crossed the river and started the Leighton-Howard Steel Co. Looking about for talent, they prevailed on James C. Davis, originator of the Davis steel wheel, to leave the Sargent Co. and come down to East St. Louis as general manager.

These are the steel foundries that were under the scrutiny of a notable group of midwesterners in the year 1902. Presently these companies—at Granite City, East St. Louis, Chicago, Alliance, Pittsburgh, Franklin, Sharon and Chester—were to be combined into one corporation, henceforth to be known as American Steel Foundries.

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Honor 25-Year Men

Honored recently at a testimonial dinner of the 25-Year Club of the Dodge Steel Co., Philadelphia, Nathan Snow, Jacob Jackowski and Edward Bauman were presented with gold watches by President Clarence Tolan Jr., in recognition of their quarter century of service with the firm.

TRADE PUBLICATIONS

For More Details Use Reply Card—Page 278

SLAG DISPOSAL: American Conveyor Co., 1115 West Adams St., Chicago 7—Illustrated folder discusses portable slag disposal unit which is said to be capable of handling the slag produced by cupolas melting from 5 to 25 tons per hour. Specifications are included.

For More Details Circle No. 120—Page 278

BLOWERS AND EXHAUSTERS: Air Appliance Division, U. S. Hoffman Machinery Corp., 105 Fourth Ave., New York 3—Bulletin A-932 concerns design and performance features of multistage centrifugal blowers and exhausters for 1 to 9 psi pressures or for vacuums from 2 to 12 in. of mercury. Applications data, performance curves and other information are included.

For More Details Circle No. 121—Page 278

NODULAR IRON CASTINGS: American Brake Shoe Co., Dept. A, 230 Park Ave., New York 17—Booklet lists properties, characteristics and applications of three standard grades of nodular iron produced by two divisions of the firm. Typical castings for use in aviation, chemical, diesel and general industrial fields are pictured.

For More Details Circle No. 122—Page 278

BLAST CLEANING: Pangborn Corp., 1400 Pangborn Blvd., Hagerstown, Md.—Bulletin 100A points out that despite advances in automatic equipment and airless blast cleaning, many jobs can be accomplished only by the use of hand-operated nozzle blast cleaning equipment. The booklet describes such devices and offers information about their use.

For More Details Circle No. 123—Page 278

STACKING PALLETS: Stak-Mor Sales Co., 1931 Olive St., St. Louis 3—Bulletin 35 describes construction, function and advantages of stacking pallets that are custom designed to be suitable for any type of pallet or fork truck and for any materials handling job.

For More Details Circle No. 124—Page 278

AIR CYLINDER HOIST: Air Control Division, Lehigh Foundries Inc., 1500 Lehigh Drive, Easton, Pa.—Data sheet describes features, operation, advantages and specifications of air cylinder hoists for materials handling.

For More Details Circle No. 125—Page 278

JIB CRANES: Chicago Tramrail Corp., 4000 Washington Blvd., Chicago 24—Bulletin contains general information concerning jib cranes. Specifications, charts, illustrations, explanatory remarks and other material cover the subject.

For More Details Circle No. 126—Page 278

ALLOY CASTINGS: Meehanite Metal Corp., 714 North Ave., New Rochelle, N. Y.—Bulletin 38 is devoted to the use of castings made of

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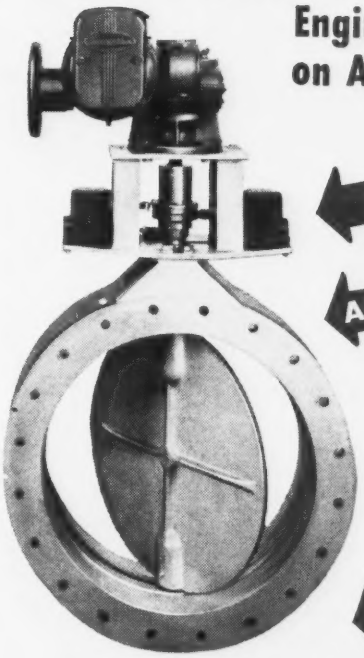

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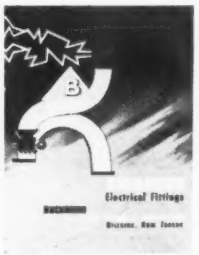
the company's alloy for component parts of machine tools. Illustrations show finished machine tools and indicate specific castings involved in their manufacture.

For More Details Circle No. 127—Page 278

ROLLER CHAIN: Dodge Mfg. Corp., Mishawaka, Ind.—Bulletin A-624 contains data helpful in selecting, specifying or buying roller chain and sprockets. One page is devoted to the company's sprockets for each size of chain from No. 40 to No. 100 inclusive. Each page includes a cross section drawing, dimensions, number of teeth, sprocket and bushing numbers and other information. Five pages are devoted to selection data.

For More Details Circle No. 128—Page 278

ELECTRICAL FITTINGS: Buchanan Electrical Products Corp., Hillside, N. J.—Catalog 53 describes the manufacturer's complete line of solderless wire connectors and specialized electrical fittings. Illustrated information concerns connectors, insulated bushings for electrical metallic conduit, plugs and terminal blocks. Complete specifications, dimensional data, application instructions and ordering information are included.



For More Details Circle No. 129—Page 278

SAFETY: National Safety Council, 425 North Michigan Ave., Chicago 11—The Safety Council's new "Handbook of Accident Prevention for Business and Industry" is a convenient safety guide for the manager of a small business or the supervisor of a department in a large organization. It shows how to set up and maintain a safety program and advises how to make use of outside assistance.

For More Details Circle No. 130—Page 278

LIGHTING: General Electric Co., Nela Park, Cleveland 12—Bulletin 8 of the "See Better—Work Better" series describes what it calls the "revolution in industrial lighting." It discusses the concept of balanced brightness as a vital adjunct of sufficient light.

For More Details Circle No. 131—Page 278

FLEXIBLE METAL HOSE: Atlantic Metal Hose Co., 123 West 64th St., New York 23—Bulletin 15-D contains illustrations of high-pressure interlocking bronze and steel flexible hose, tar and asphalt hose, load and unloading and necessary couplings. It lists all current applications and provides full test and engineering data.

For More Details Circle No. 132—Page 278

ATLANTA, GA.: Industrial Bureau, Atlanta Chamber of Commerce, Atlanta, Ga.—The 1953 edition of "Facts in Figures about Atlanta"

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in the new paste type core and mold washes.

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contains information pertaining to the population, climate, transportation facilities, utilities, taxes and other factors important to the growth and development of the area.
For More Details Circle No. 133—Page 278

ALUMINUM ALLOY: William F. Jobbins Inc., P. O. Box 230, Aurora, Ill.—Booklet discusses composition, physical properties and other data, including applications, of the company's aluminum-magnesium type of high-purity, virgin aluminum alloy.
For More Details Circle No. 134—Page 278

MAINTENANCE TOOLS: Erie Tool Works, Erie, Pa.—Catalog 353 shows the company's complete line of tools for plumbers, steamfitters and machinists. It covers technical data and explains the organization's unconditional guarantee on its products.
For More Details Circle No. 135—Page 278

BAG PACKER: E. D. Coddington Mfg. Co., 5024 North 37th St., Milwaukee 9—Folder describes operation, mechanical features and advantages of machine which packs valve type bags. Cutaway diagram shows how machine is constructed.
For More Details Circle No. 136—Page 278

PRESSED STEEL POTS: Eclipse Fuel Engineering Co., Rockford, Ill.—Bulletin N-1 consists of a catalog of new pressed steel pots for lead, salt, cyanide, oil tempering and metal melting. Specifications and illustrations are included.
For More Details Circle No. 137—Page 278

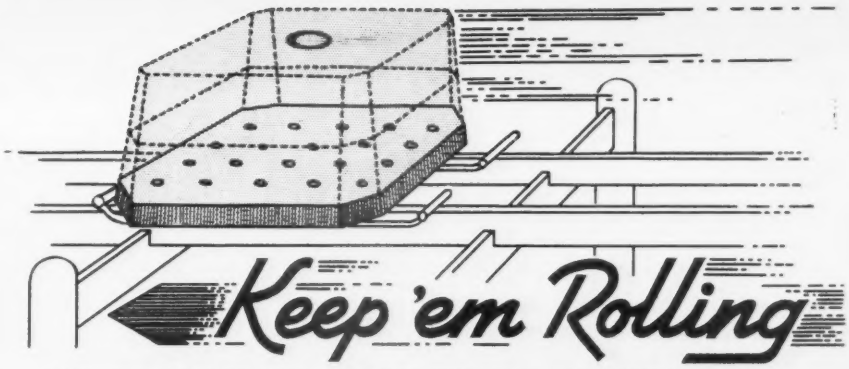
SUSPENDED MAGNETS: Magnetic Engineering & Mfg. Co., Clifton, N. J.—Catalog 752 describes and illustrates suspended magnets of various types, advises as to what type to use for given kinds of applications and gives specifications data.
For More Details Circle No. 138—Page 278

STEEL SHOT: American Wheelabrator & Equipment Co., 1102 South Byrkit St., Mishawaka, Ind.—Folder describes structure, hardness, breakdown resistance and uniformity of steel shot. Nineteen control checks made for quality are listed.
For More Details Circle No. 139—Page 278

SPIRAL CONVEYORS: Jeffrey Mfg. Co., Columbus 16, O.—Catalog 851, reprinted from the firm's general merchandise catalog 418, offers illustrations, cutaway drawings, descriptions, specifications and other data concerning spiral conveyors and their components.
For More Details Circle No. 140—Page 278

FORK TRUCK: Baker-Raulang Co., 1223 West 80th St., Cleveland 2—Bulletin 1344 describes operating features of a gasoline engine fork truck with electric transmission that operates without clutch, controller or resistors. Dimensions, specifications and diagrams are included.
For More Details Circle No. 141—Page 278

PNEUMATIC RECEIVERS: Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Wayne



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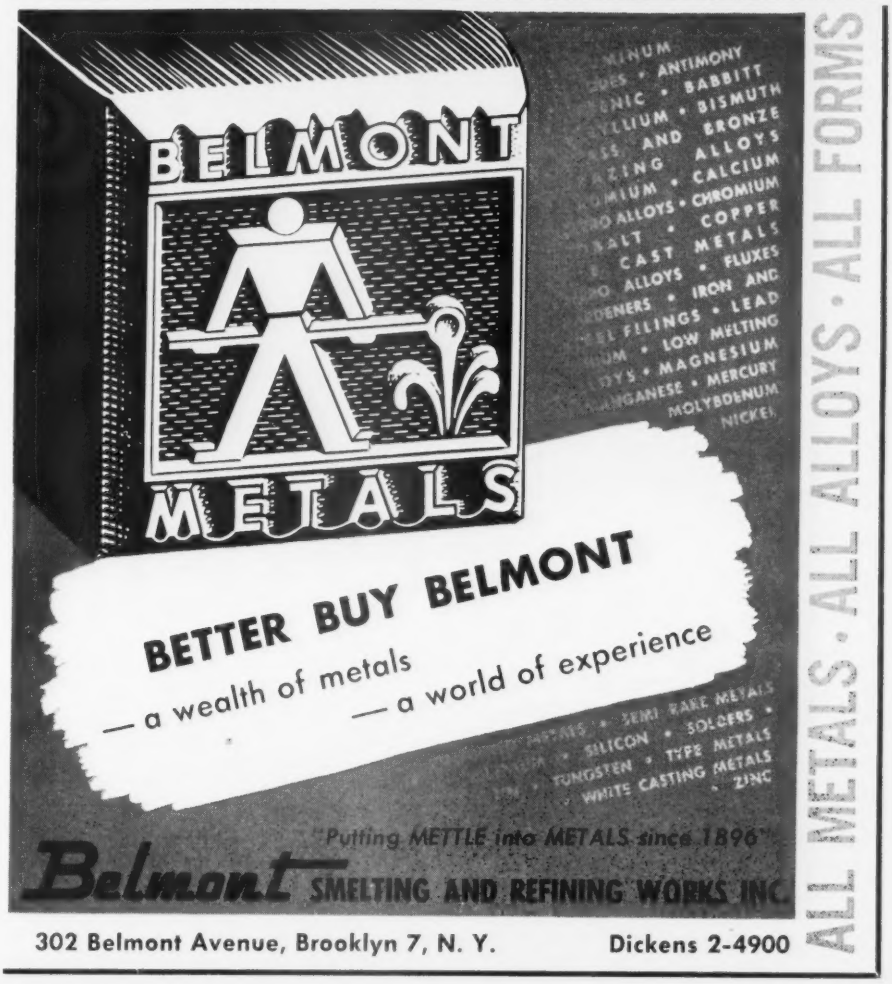
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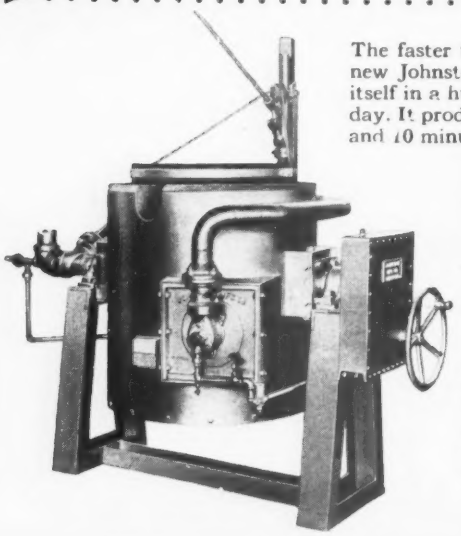

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Photo courtesy of Supreme Brass & Aluminum Foundry, Los Angeles, Calif.

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& Windrim Aves., Philadelphia 4. Specification sheet 285 describes pneumatic receivers which are furnished as indicating controllers, recorders and recording controllers. Construction and engineering details are included.

For More Details Circle No. 142—Page 278

MICROPHOTOMETERS: Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44—Catalog EM9-90(2) offers complete information about the Knorr-Albers recording microphotometer and the Vincent-Sawyer spotting microphotometer. Photographs illustrate operational features of both instruments.

For More Details Circle No. 143—Page 278

SCREENS: Simplicity Engineering Co., Durand, Mich.—Catalog 53 offers detailed information about screens for sizing, separating and dewatering of sand and other materials. Additional sections are concerned with dewatering wheels, feeders and conveyors.

For More Details Circle No. 144—Page 278

MAGNETS: Dings Magnetic Separator Co., 4740 McGeogh Ave., Milwaukee 14—Catalog 301-A describes and illustrates various types of magnetic equipment in terms of construction, operation, application and specifications. Emphasis is on rectangular triple pole magnets.

For More Details Circle No. 145—Page 278

COUPLERS: Snap-Tite Inc., 26 Titusville Rd., Union City, Pa.—Catalog VP-83 includes information on physical features, operating characteristics, specifications and applications of quick-connect and disconnect couplers said to provide up to 80 per cent flow of open pipe size.

For More Details Cirlce No. 146—Page 278

HOSE CARE: Hewitt-Robins Inc., 240 Kensington Ave., Buffalo 5—Bulletin called "Tips on Hose Care" tells what to do and what not to do in the use and storage of various kinds of hose, including steam, fire, oil, gasoline, water, air, suction and sandblast hose.

For More Details Circle No. 147—Page 278

DYE PENETRANTS: Turco Products Inc., Terminal Annex 2649, Los Angeles 54—Booklet describes two dye penetrant methods of locating casting flaws. One is a portable type; the other is meant for high production inspection.

For More Details Circle No. 148—Page 278

PAVING BREAKERS: Ingersoll-Rand Co., Department RD, 11 Broadway, New York 4—Form 4127 deals with paving breakers for maintenance and construction work. Each machine is described as to specifications and as to jobs it can perform.

For More Details Circle No. 149—Page 278

WEIGHT INDICATOR: W. C. Dillon & Co., 14620 Keswick St., Van Nuys, Calif.—Bulletin W-1 contains illustrations, latest price schedules and engineering details pertaining to portable crane scales.

For More Details Circle No. 150—Page 278

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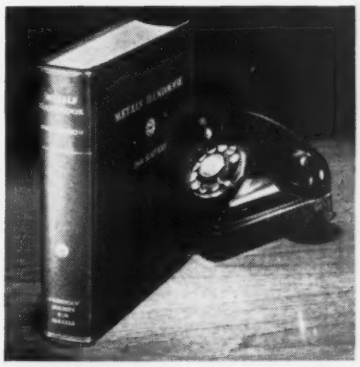

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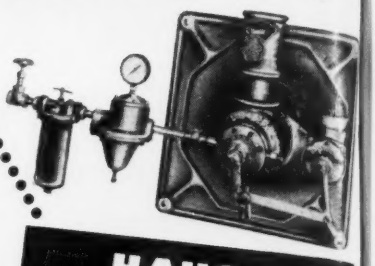

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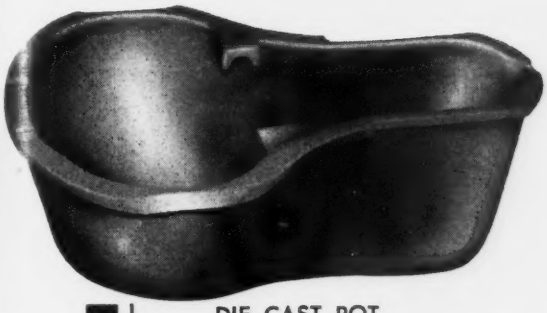

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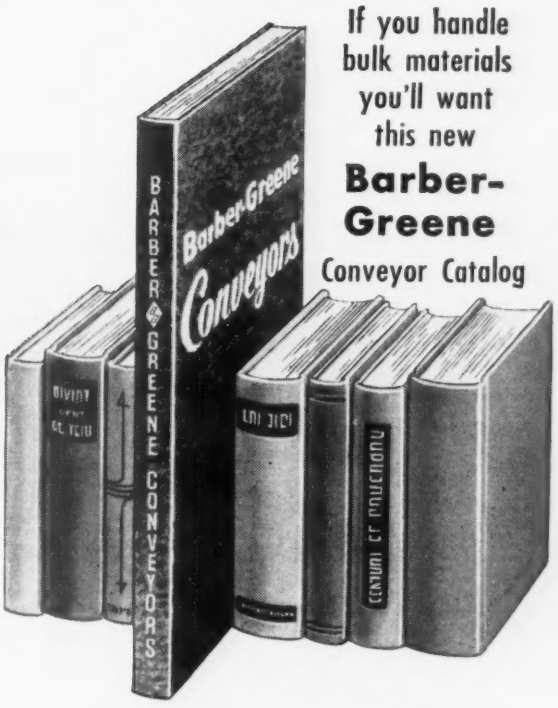

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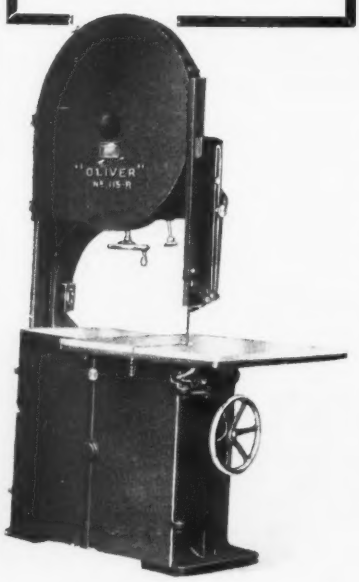

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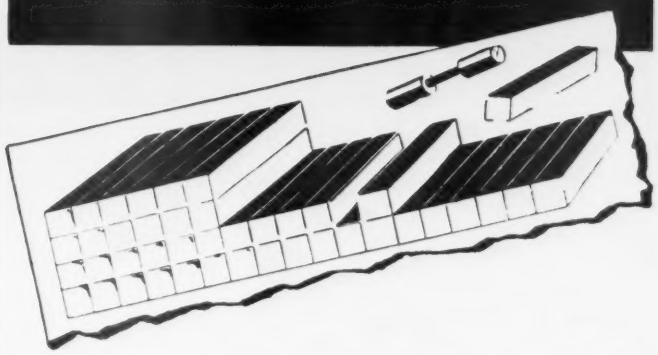

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40-E Step Block Casting Cut Into 42 Test Bars—Physical Properties of each Shown in Squares.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Y.S.	22.5	20.0	21.2	20.6	20.5	22.0	20.8	21.0	21.8	22.5	23.0	23.4	23.0	25.0	23.8	22.5	23.5	24.6
T.S.	38.3	33.0	33.1	32.7	33.8	36.0	33.8	32.5	33.3	34.5	34.0	37.2	37.8	39.0	36.8	36.5	36.7	40.0
El.	12.5	10.0	6.0	4.0	7.5	7.5	8.0	7.0	7.0	7.5	7.0	8.0	8.5	8.5	7.5	8.0	7.5	10.0

	30	29	28	27	26	25	24	23	22	21	20	19
Y.S.	22.0	23.0	22.5	21.5	22.5	23.5	22.5	23.5	23.5	23.8	22.8	23.8
T.S.	36.3	35.3	35.3	35.0	35.0	37.3	34.5	32.0	32.5	32.5	35.0	38.3
El.	10.0	6.0	9.0	7.5	7.5	6.0	5.0	5.0	5.0	5.0	7.5	7.5

	31	33	33	34	35	36
Y.S.	23.0	22.8	22.5	24.0	23.5	23.0
T.S.	36.3	33.3	32.5	32.5	36.3	39.0
El.	8.0	5.0	5.0	5.0	7.0	8.5

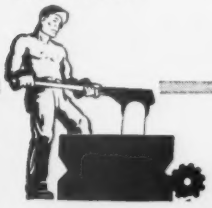
	42	41	40	39	38	37
Y.S.	23.3	23.7	23.0	23.2	23.0	22.5
T.S.	33.2	37.1	36.4	37.3	38.0	40.8
El.	3.0	8.0	6.5	6.5	11.0	11.0

Separately-Cast Test Bar Properties		
NAT. AGED 21 DAYS	Y.S.	23500
	T.S.	36600
	El.	7.5

PROPERTIES OF CASTING (BASED ON TENSILE STRENGTH READINGS)			
	Maximum	Minimum	Average
Y.S.	25,000	22,500	22,700
T.S.	40,800	32,500	35,500
El.	11.0	5.0	7.5

Write TODAY for full details about Frontier 40-E Aluminum Alloy . . . including FREE DATA BOOK.

S. A. E.	310
A. S. T. M.	B-26-50T Alloy ZG-61A (Castings)
A. S. T. M.	B-179-51T Alloy ZG-61A (Ingots)
Federal	QQ-B-601a Comp. 17
Navy	QQ-B-601a Comp. 17 46A-1-Class 1
Air Corps	QQ-B-601a Comp. 17



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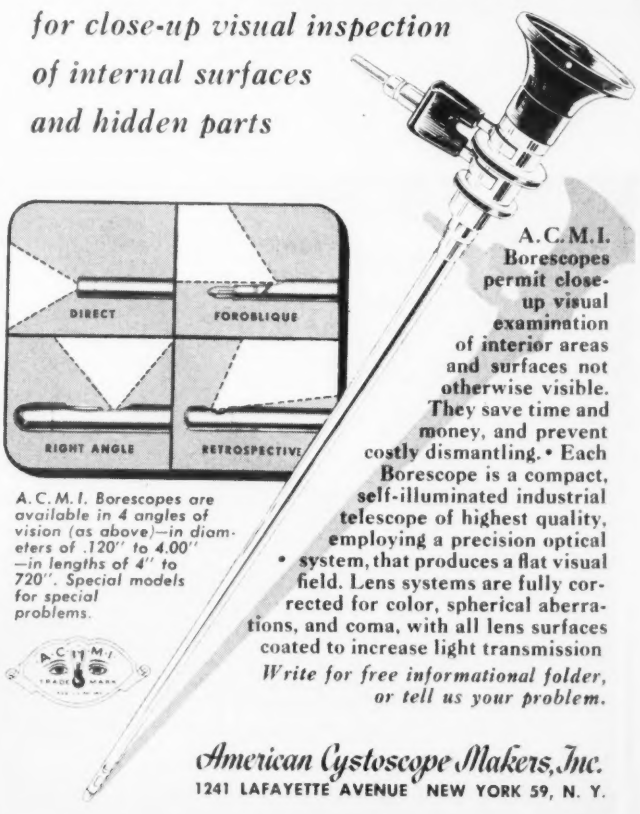

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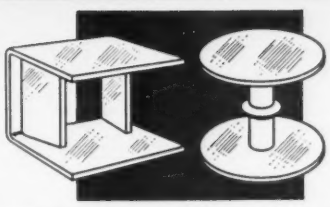

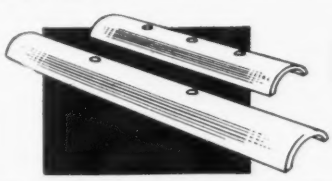

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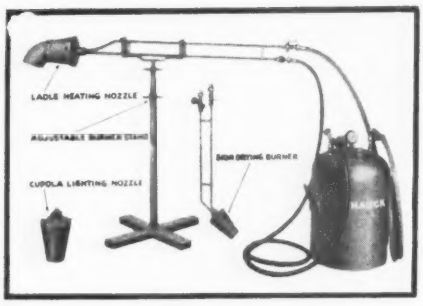

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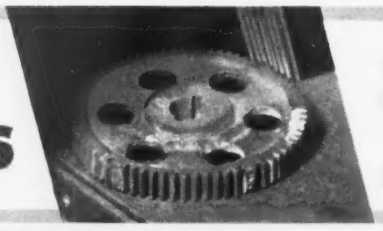

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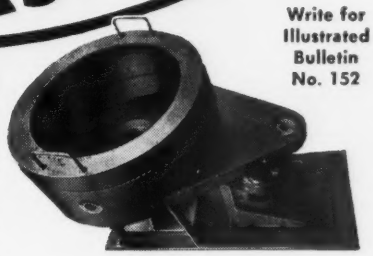

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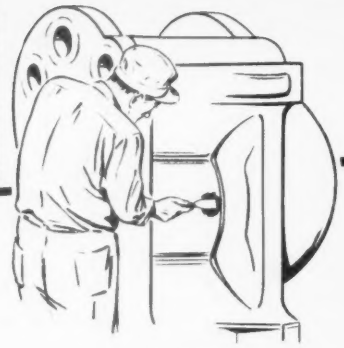

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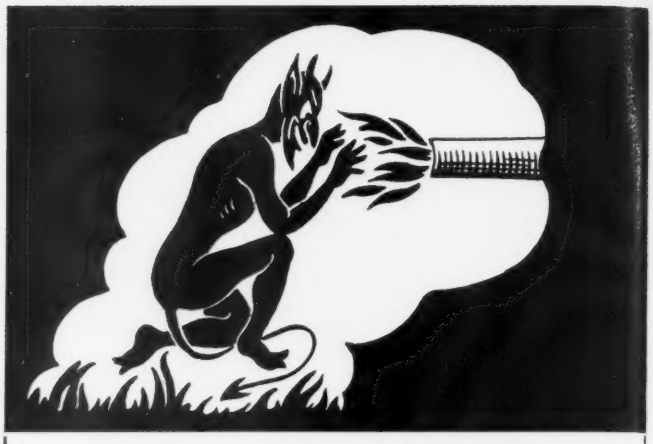

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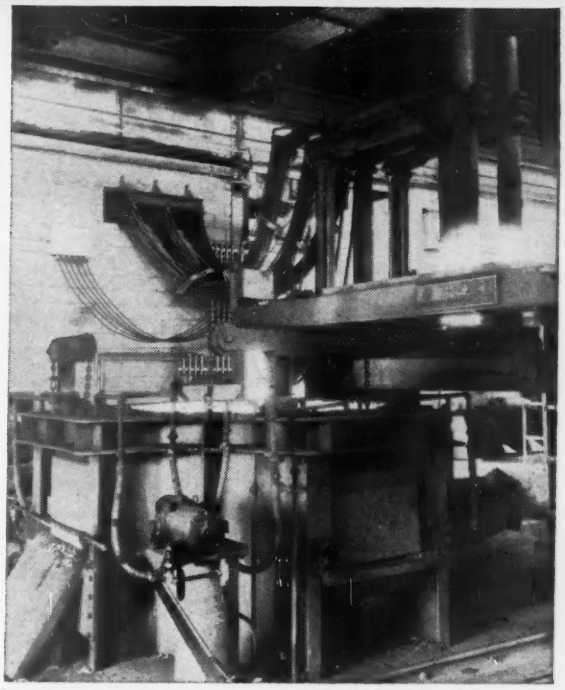

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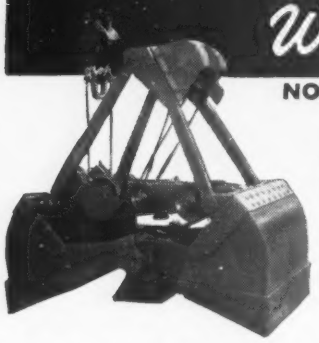

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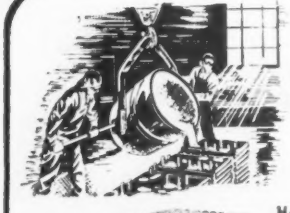

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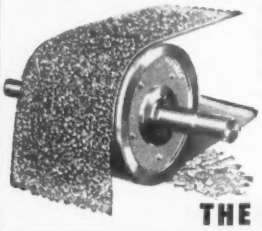

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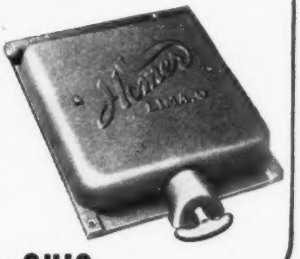

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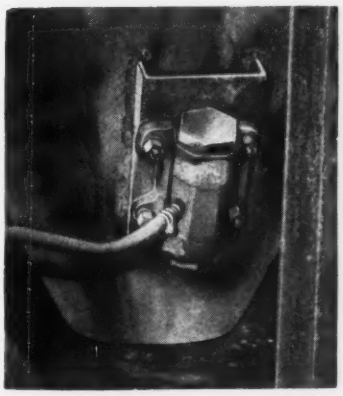

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spreads like paste
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NO HEAT OR SPECIAL TOOLS
Sands to feather edge
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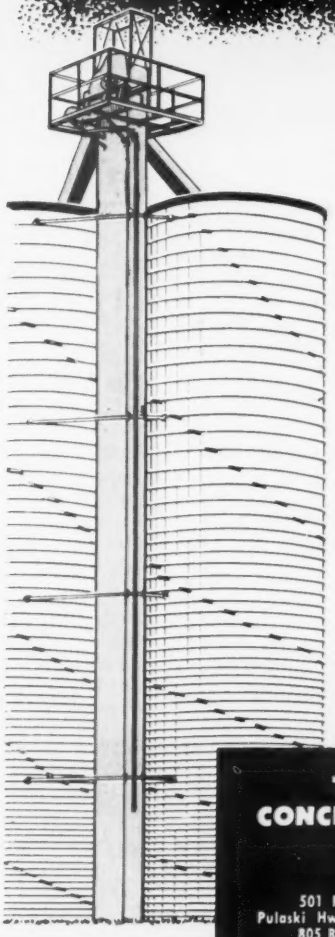
store core sand right... in MARIETTA CONCRETE SILOS



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- Recognized sourcebook of information on how to eliminate casting defects.
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AIR AND HYDRAULIC
Control Valves

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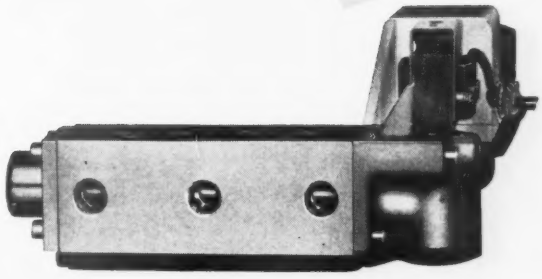

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They'll give you millions of cycles of efficient trouble-free operation

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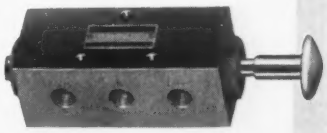

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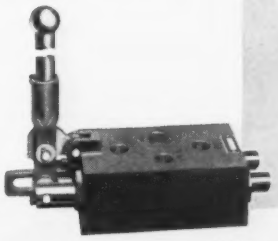

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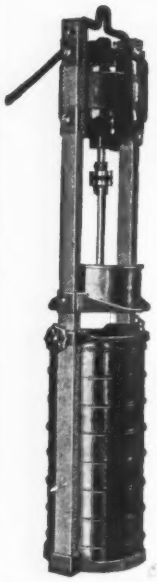

Type "HL" Lab Sifter for sand control $225.00 without sieves

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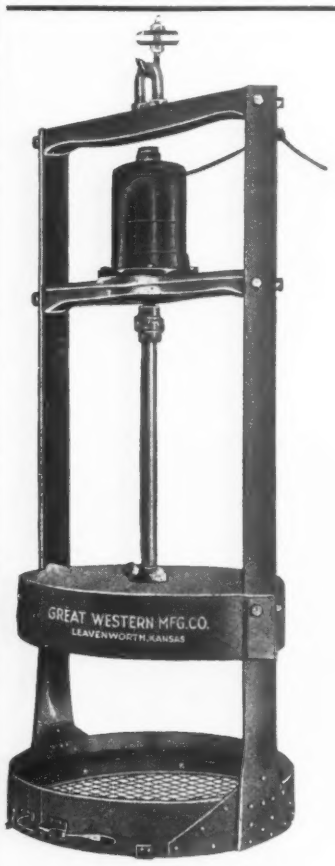
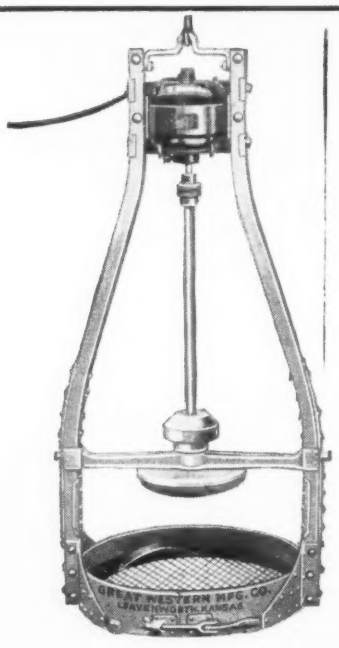


Type "CR" with 24" sieve $310.00



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Must have technical background and malleable foundry experience.
Should have inclination and personality to work towards sales position and be prepared to travel. Write stating full details and salary expected.

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Capable of setting up and operating Permanent Mold department of old established Foundry. Excellent opportunity for right man. State full particulars.

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FOUNDRY METALLURGIST

With experience in cast iron foundry practice. Prepared to travel. State age, experience, and salary required. Address: Box 704, FOUNDRY, Cleveland 13, Ohio.

CORE ROOM SUPERINTENDENT

For completely mechanized Eastern foundry. Experienced in all phases of core blowing, sand control and establishing production standards. State age, experience and salary requirement. Address: Box 649, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY TECHNOLOGIST

Preferably with some experience in cast iron. Should be prepared to travel. State salary required and full qualifications. Address: Box 705, FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Opportunity for well qualified, experienced superintendent of nonferrous foundry employing 100-150 people. Applicant should be between 35-45. Enclose photograph and give complete record of education and experience in detail including previous employment and length of service. Address: Box 722, FOUNDRY, Cleveland 13, Ohio.

PERMANENT MOLD SUPERINTENDENT

Excellent opportunity with large, modern Midwestern foundry having up-to-date equipment. Your experience should consist of permanent mold design or the operation of aluminum jobbing production. No other metal cast. Die design and gating knowledge essential. Promotional opportunities not limited. Attractive starting salary. Write stating age, experience, references and salary desired. Address: Box 762, FOUNDRY, Cleveland 13, Ohio.

CHIEF INSPECTOR

Take full responsibility of our Inspection Department in big aluminum sand casting foundry. To qualify, you must know techniques of X-ray, zyglow, layout and be able to maintain quality control on aluminum aircraft castings. Excellent opportunity merits consideration of only top-flight man. Many company benefits. Write giving age, experience, references, salary desired. Confidential. Address: Box 760, FOUNDRY, Cleveland 13, Ohio.

WANTED CORE DEPARTMENT FOREMAN

For progressive foundry in Indiana. Must be capable of supervising core department for maximum efficiency and have knowledge for rigging equipment for blowing cores. Write, giving full details of personal background, experience and salary expected. Address: Box 763, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

To take charge of Squeezer department. North Central Ohio. Must be cost minded and go getter. State back-ground and salary expected. All replies confidential. Address: Box 764, FOUNDRY, Cleveland 13, Ohio.

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SUPERINTENDENT ALUMINUM FOUNDRY

Position calls for experience in sand casting aluminum jobbing work. Superintendent must know pattern and core box equipment. Brass and bronze jobbing experience also would be helpful. Knowledge of mechanical and jobbing procedures in a nonferrous foundry preferred. This is an excellent opportunity in one of the nation's largest multiple-plant foundries, located in the Middlewest. Write, giving age, experience, references, education and salary desired. Replies confidential. Address: Box 761, FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRY SUPERINTENDENT

Opportunity for the right man in a well-established midwest steel foundry producing 500-600 tons per month. Must be under 45 years old and must have had experience in electric furnace melting, cope and drag machine molding, gating and rigging. Applicant should have knowledge of cleaning, finishing and heat treating. Must be qualified to take over entire operation after six months on job. Must have good past record in labor relations. Good starting salary plus bonus. Address: Box 773, FOUNDRY, Cleveland 13, Ohio.

COREROOM FOREMAN

Experienced in making all types of cores for light and medium weight castings on bench and blow machines. Must be capable of mixing of core sands, drying, assembling and training help, both male and female. Only an experienced man with good personality and capable to estimate and establishing piece work core prices need apply. State age, experience and salary expected. All replies will be treated strictly confidential. Address: Box 780, FOUNDRY, Cleveland 13, Ohio.

SUPERVISOR

Thoroughly experienced in high production mechanized jobbing foundry operation. Must have record of ability to handle men and thorough knowledge of modern equipment and methods. Established Eastern Foundry. State age, experience and salary. Address: Box 655, FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Medium jobbing foundry in middle west has opening for qualified shake out foreman. Must be able to handle men and thoroughly understand machinery. Address: Box 759, FOUNDRY, Cleveland 13, Ohio.

GENERAL WELDING SUPERVISOR

Technically and practically qualified. Foundry experience desirable. Excellent opportunity with well established midwest organization. All replies confidential. Address: Box 789, FOUNDRY, Cleveland 13, Ohio.

CORE ROOM FOREMAN

Experienced in steel foundry practice. In replying give complete information which will be held in strict confidence by a single executive. Address: Box 726, FOUNDRY, Cleveland 13, Ohio.

GENERAL FOUNDRY FOREMAN

For medium sized Ohio gray iron semi-production foundry. This foundry being mechanized. State salary expected and all personal history in first letter. All replies confidential. Address: Box 765, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

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Mature, profit-minded, dependable. Has successfully managed four companies—two taken out of the red. Available for service shortly with medium-size company requiring reliable directing ability in management, sales finance and production. Excellent experience, foundry machine and related lines. Address: Box 769, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY METALLURGIST

Married, 30, degree in Metallurgy plus a four-year foundry apprenticeship. Broad background dealing with nonferrous casting problems. Desire position as a foundry metallurgist or in foundry supervision. Address: Box 749, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

NONFERROUS FOUNDRY SUPERINTENDENT

Thirty-five years' practical and technical experience in brass, bronze and aluminum alloys, jobbing and production. Wide experience in metals, melting and layout of patterns for production and quality castings including gating. Sand control and mechanized foundry experience. Presently employed. Will go anywhere quality and production is appreciated by compensation in salary after proven ability. Prefer foundry with large production. Address: Box 782, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGER OR SUPERINTENDENT

Twenty-seven years' experience on machine tool castings; several years as superintendent, general superintendent and assistant manager. Proven executive ability to develop an organization with effective controls over quality, costs and profits. Reputation established as foundry consulting engineer. Under 45. Address: Box 778, FOUNDRY, Cleveland 13, Ohio.

PATTERNMAKER

Middle aged, capable manage shop or work on bench, first class mechanic. Experienced job shop and foundry production, pattern rigging, wood, metal patterns, core blowing and driers, plastic patterns as now in use in production work or pressure cast aluminum plates. Estimate and layout work, etc. Address: Box 784, FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

Available. Capable, qualified and experienced to direct all phases of foundry activities. Light to medium heavy work. Green and dry sand. Well versed in cupola operation and metallurgy. Fifteen years in present executive position. Middle aged. Good appearance. Pleasing personality. Address: Box 620, FOUNDRY, Cleveland 13, Ohio.

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Twenty years as foreman and department manager. Experienced in the machine tool and heavy mill industry. Also experienced in purchasing patterns and castings. Complete coordinating service. Iron and steel foundry background and connection. References and resume on request. Address: Box 775, FOUNDRY, Cleveland 13, Ohio.

PERMANENT MOLD DESIGNER AND FOUNDRYMAN

Experienced in all phases jobbing or high production. Position must involve responsibilities and opportunities. Address: Box 790, FOUNDRY, Cleveland 13, Ohio.

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Well versed in all foundry procedures. Consulting on metallurgy, sand, quality control, melting procedures, production and general foundry problems. Desire position with gray iron foundry. References. Address: Box 751, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Desire position with iron or steel foundry in melting, laboratory, heat treating, sand control or inspection. Experience covers melting with both cupola and electric furnace and all phases of laboratory control. Capable of meeting customers and promoting good relatinships. Age 38. Now employed as metallurgist with very high production gray iron foundry. Address: Box 774, FOUNDRY, Cleveland 13, Ohio.

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SUPERINTENDENT OR GENERAL FOREMAN

Experienced in all phases of foundry practice—molding, melting, coremaking, cleaning, heat treating, sand mixtures, gates and risers—carbon, alloy and corrosion resisting steels—pressure castings. Thirty years in foundry, eighteen years superintendent and general foreman. General jobbing and production. Now available. Address: Box 739, FOUNDRY, Cleveland 13, Ohio.

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Engineering graduate, fifteen years present executive position. Thoroughly experienced in highly mechanized foundry and machine shop operations; malleable gray iron and brass. Consistent record of high production, quality product and company minded labor policies. 47 years of age. Address: Box 772, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Electrical engineer and practical man. Thirty years as superintendent of maintenance and construction of steel, highly mechanized gray and malleable iron foundries. Trained for labor relations, and controlled maintenance. Address: Box 733, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Sixteen years' experience melting all kinds of iron in both cupola and electric furnace. Experienced in sand control, chemical and physical testing and molding. Address: Box 770, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Gray iron, 28 years' experience in production and jobbing, 10 years as a manager of plants with daily tonnages as high as 125 ton, employing up to 300. Man of unquestionable character and excellent ability. Know foundry thoroughly. Address: Box 661, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Superintendent or general foreman. Practical man. Twenty-seven years' experience in gray iron and nonfrrous jobbing and high production shops. Now employed. Address: Box 768, FOUNDRY, Cleveland 13, Ohio.

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Complete knowledge gray iron, ductile or cupola malleable, duplexing, all foundry operations, practical experience. Accept superintendent or general foreman in New England. Address: Box 776, FOUNDRY, Cleveland 13, Ohio.

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Available to set up and operate matchplate shop. Twelve years' experience in the plaster field. Address: Box 756, FOUNDRY, Cleveland 13, Ohio.

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Twenty-five years' experience in all phases of steel foundry procedure, twelve years as foreman. Able to get along with men and try to reduce scrap. Age 43. Address: Box 786, FOUNDRY, Cleveland 13, Ohio.

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Steel casting firm desires salesman with background to sell carbon, low alloy and stainless castings on Eastern seaboard.
Firm now producing pressure castings. Has X-Ray equipment and complete facilities.
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Graphite refractories to nonferrous foundries and steel mills New England and New York City; straight commission; experienced; practical background desirable; write giving full details and references. Address: Box 755, FOUNDRY, Cleveland 13, Ohio.

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MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address Box 578, FOUNDRY, Cleveland 13, Ohio.

WANTED

Shell Molding Equipment Wanted. Address: Box 767, FOUNDRY, Cleveland 13, Ohio.

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WANTED

1—Hough Payloader
1—No. 2 Simpson Mill
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2—No. 2136 G-S.P.O. Portable Jolt Squeeze pin lift machines
2—Osborn #712 Portable Jolt Squeeze pin lift machines.
ALL EQUIPMENT MUST BE IN GOOD CONDITION.

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Induction Furnaces, Screens, Simpson Mixers, Riehle Compression Testing Machines, Pulverizers, Grinders, Conveyors. Address: **P.O. BOX 1351, CHURCH STREET STATION, NEW YORK 8, NEW YORK.**

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Foundry equipped for bench squeezer, rollover and floor work for castings up to 2500 lbs. Whiting No. 4 cupola with Spencer Turbo Blower. Good core capacity, also Wheelabrator. Capacity 10-12 tons shipments daily, with room for extension of molding floor. Adjacent RR track. Serves all New England States.

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Fully equipped jobbing and production gray iron foundry in Central Wisconsin with daily capacity up to 10 tons. $36,000 full price. Address: Box 740, FOUNDRY, Cleveland 13, Ohio.

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Foundry and machine shop in operation. Established trade over 20 years. Ample grounds, good buildings. Address: T. I. RAGAN, 2202 E. OKLAHOMA PL., TULSA, OKLAHOMA.

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For Sale

FOR SALE

MOLDING MACHINES

2—No. 275 Osborn jolt squeezers.
2—Deuscher Stationary jolt squeeze.
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers.
4—#610 Johnston & Jennings Air Jolt Rollover Draw Portable 24 x 30 table.
1—Tabor 36 x 50 table Air Jolt Rollover Draw, 3000# capacity.
2—International PKL 14"-5½" Jolt Squeeze Pin Lift.
1—Tabor Pedestal Core Rollover Hand Ram Rollover Draw 14 x 20 table 8" draw.

BLOWERS FOR CUPOLAS AND FURNACES

2—15 HP Spencer-Turbine 2250 CFM at 16 oz.
10—High temperature blowers 1400° F. 9000 to 15000 C.F.M.
2—#7½ Roots rotary blowers—27 x 81—14000 CFM.
1—Connersville rotary blower 22 x 66 45 cu. ft. per revolution 9000 CFM.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—5 HP 20-oz. Spencer Turbine Blowers.
2—2 HP 20-oz. Spencer Turbine Blowers.

METAL MELTING EQUIPMENT

1—1000# open flame brass melting furnaces, gas fired.
1—Hausfeld Stationary Brass, Multiple gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas, 250# Al Cap.
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired.
New 32" to 41" dia. shell cupolas made to order.
New 1000 lb. aluminum cap. tilting crucible furnaces to specifications.

MISCELLANEOUS

1—Beardsley & Piper Motive Sandslinger on rails, 19" head, 14' 6" swing, 3/60/220.
1—Simplicity Model B Sand Conditioning Unit, 4' x 8' double deck screens with aerator for piling.
1—Beardsley & Piper Screenarator, Model M, 3/60/220.
1—Stoney crane type shakeout.
1—Dings type M magnetic separator.
1—NC-4 sand separator.
1—#1 Demmler core blower.
2—#16 Roto-clone units complete.
1—McLeod Small Sand Blast Barrel 24 x 24.
1—36W Wet Type Roto-Clone 34000 CFM.
1—24W Wet Type Roto-Clone 13000 CFM.
Complete stock of rebuilt mill and dust exhaust blowers.
1—27 x 36 American wheelabrator, tumblast with rubber belt.

CLIFTON MACHINERY COMPANY
1013 W. SIXTH ST. CINCINNATI 3, OHIO

For Sale

FOR SALE
TURBO BLOWERS WITH MOTORS

CFM	PRESS.	MAKE	CFM	PRESS.	MAKE
4500	16 oz.	G.E.	660	20 oz	A-B
3500	40 oz.	Spencer	500	10 oz.	No.Am.
2800	1 oz.	Spencer	400	4.3 oz.	Spencer
2700	16 oz.	No.Am.	340	20 oz.	A-B
2700	16 oz.	Spencer	320	12 oz.	Spencer
2500	7 oz.	Sturt.	225	16 oz.	Spencer
2000	2½ oz.	Spencer	180	15 oz.	Spencer
2000	1 oz.	Spencer	9100	7" SP	Sturt.
1150	20 oz.	No.Am.	1100	4½" SP	Bayley
800	8 oz.	No.Am.	100	7" SP	Spencer

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE.
CLEVELAND 14, OHIO

FOR SALE

Hines Aluminum Pop-Off Flasks in good condition with ¾" Rd. & ¾" Hex Pins. Complete with bail handles and 1½" steel flange. Available for inspection and delivery at 50% of today's market value, F.O.B. East Chicago, Indiana.

14" x 20"	6" & 8" Copes	5"-6"-7" & 8"	Drags*
16" x 20"	6" Copes	5"-6"	Drags*
16" x 24"	8" Copes		
14" x 20"	6" & 7" Copes	5" & 7"	Dragst
14" x 24"	5" Copes	5"	Dragst

* Heavy Duty. †Medium Duty.

AMERICAN STEEL FOUNDRIES
PURCHASING DEPARTMENT
410 N. MICHIGAN AVE. CHICAGO 11, ILL.
TELEPHONE: SUPERIOR 7-4080

FOR SALE

Motors, Generators, Transformers from 1 HP to 2500 HP
World headquarters for T.E.F.C. and explosion proof motors.
World's largest inventory.

ELECTRIC EQUIPMENT CO.
ROCHESTER, N. Y.

FOR SALE

1—Milwaukee Jolt Rollover, Model No. 60-B-4, Serial No. 12471, Table size 30" x 60". Machine used only six months. Available for immediate delivery. Wire, Phone or Write:

SOUTHERN CAR & MFG. CO.
400—7th ST. SO. BIRMINGHAM, ALABAMA
TEL: 4-1714

FOR SALE

1—American Sandcutter A.M.
1—Spencer Turbo Compressor—1350 Cu. H.P.M. @ 32 oz. 25 H.P. Westinghouse Motor
2—Simplicity Shakeout Screens 4 ft. x 6 ft.
1—American Wheelabrator Tumblast 36 x 42 with skiphoist.

MARCH BROWNBACK CO., INC.
SOUTH & CHARLOTTE STS.
POTTSTOWN, PENNSYLVANIA

FOR SALE

Clearfield #920 Mixer, excellent condition, Serial 205-C. Complete with motor and starter. Address: **WM. P. LAYTHAM & SONS COMPANY, 925 MARKET STREET, PATERSON, NEW JERSEY.**

CLASSIFIED ADVERTISING

For Sale

JUST PURCHASED FROM THE DU PONT COMPANY

1—Herman Jar Rollover and Pattern Draw Molding machine—New in Nov., 1944; 48 x 144"—10,000# Series Rollover Serial No. 1812; 48 x 144"—24" solid cylinder jolt machine Serial No. 4167; rear discharge roller conveyor complete; No. 4 (1½") Electro Pneumatic Timing Device 115 volts, 60 cycles; 2 sets 6000# Pneumatic Flask Clamps complete with special holders. OFFER

1—3000 lb. Electro Lift Hoist frame "B" (Jib Crane) push button control—single speed—floor operated—complete with 220 v. 3 phase—60 cycle motor—25' lifting capacity..... $550.00

1—Beardsley & Piper Speedmuller—Model #40, Ser. No. 40-2 with rubber and steel liners with dust hood. G.E. 20 HP 1200 RPM motor. Type 900B starter; push button Hickok Ammeter; including skip hoist for sand with 2 HP, 1800 RPM gear motor and water meter $3000.00

1—International Pattern Draw machine; type JDP; 600# cap. 8" draw; on wheels. $475.00

ALSO AVAILABLE:

CORE BLOWERS

1—Model 91 Osborn—Ser. No. 10786D for small cores $750.00
3—Model 193-4 Osborns—for medium cores; cylinder draw type ..... $1500.00 Ea.
2—Model 94 Osborns—for large cores..... $2500.00 Ea.

FURNACES

2—20 Ton Lectromelt furnaces.....OFFER
1—Stroman Aluminum Furnace—reverberatory type; 1200 lb. cap. gas fired; with skip hoist and hydraulic tilting equipment.... $3000.00

MOLDING MACHINES

6—#2047 Osborn Jolt Rollover Pattern Draw molding machines—1943..... $275.00 Ea.
4—#601-13 Osborn Jolt Rollover Pattern Draw molding machines—1943..... $350.00 Ea.
1—#405 Osborn Jolt Rollover molding machine—79" table $1000.00
1—#413-3 Osborn Jolt Rollover Pattern Draw molding machine; 130" x 42"..... $6500.00
1—SPO Model 914 Jolt Rollover molding machine $250.00
1—SPO Model 2136-1 Jolt Squeeze strip molding machine—Ser. No. 210..... $700.00
4—Osborn #275J Jolt Squeezers.... $125.00 Ea.
1—#1 Johnston & Jennings Jolt Squeeze Strip Molding Machine $175.00
1—#918 Johnston & Jennings Air-Clamp-Jolt-Leveler Rollover Pattern Draw..... $1500.00
1—Herman Jolt Rollover Pattern Draw Molding Machine—80" $1500.00

SANDSLINGERS

1—Beardsley & Piper Tractor Type Sandslinger with magnetic tower—13' arm..... $7500.00
1—Beardsley & Piper Motive Junior Sandslinger with 2 speed ramming motor, 19" head; hopper type; with magnetic separator..... $7500.00

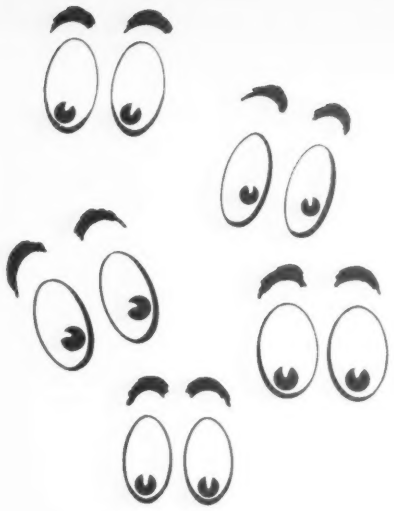
WHEELABRATORS

1—20 x 27 American Wheelabrator, Ser. No. A-48021 ..... $1750.00
1—27 x 36 American Wheelabrator, Ser. No. A-45922 ..... $2500.00

MISCELLANEOUS

1—#404 Clearfield Mixer $1000.00
1—Handy Sandy Model HS 7 GT—complete unit with 4 hoppers & conveyor..... $3500.00
1—Hyster Fork Lift Truck—with pneumatic tires; 15,000 lb. capacity..... $4500.00
1—Marschke Swing Frame Grinder—10 HP..... $650.00
1—Marschke Double End Grinder—7½ HP $375.00
2—75 HP Ingersoll Rand Air Compressors..... OFFER

FOR THE BEST DEAL
CALL
BALCHER MACHINERY COMPANY
1884 S. COMPTON ROAD
CLEVELAND HEIGHTS 18, OHIO
TELEPHONE: FAIRMOUNT 1-1186



HAVE YOU EVER NOTICED the numerous types of headings under which classified ads are listed? Whether interested in obtaining qualified personnel, selling used machinery, wanting to buy equipment, or are yourself looking for a better position, you should seriously consider advertising in the classified section of FOUNDRY MAGAZINE.

•

FOUNDRY has 45,000 readers which cover the entire foundry industry. That means that for a nominal sum you get the widest possible coverage of the industry and your advertisement reaches "just the right people".

•

The Classified Staff is equipped to handle all details in the placement of your ad.

Classified

ADVERTISING DEPT.
FOUNDRY
CLEVELAND 13, OHIO

For Sale

For Sale

WE BUY AND SELL

MOLDING MACHINES:
- Jolt Squeeze
- Rollover and Pattern Draw
- Jolt Squeeze Pin Lift
- Jolt Pin Lift

SAND SLINGERS
- Beardsley-Piper

MOLD CONVEYOR
- Link-Belt

CORE BLOWERS
- Osborn
- Demmler
- Redford

SAND MULLERS
- Simpson
- Beardsley-Piper
- Link-Belt

FURNACES
- Hausfeld 500# tilt
- Hausfeld 40# non-tilt

CLEANING CABINETS
- Hydro Whirl f. Magnesium

VARIOUS SIZES STEEL FLASKS.

GRINDERS:
- Stand, double end
- Disc single & double end
- Fin grinding f. cylinder heads

SHAKE-OUTS:
- Simplicity
- Robbins

VIBRATORS:
- Jeffrey #3 and #4

SCALES:
- Car and Floor

CHARGING CRANES
- 3 ton Sheppard

POURING LADLES
- Modern & Whiting 2000#

BLOWERS
- Cupola and furnace

IMPREGNATING ROOM
- Complete installation

CORE OVEN
- Young Brothers 2 compartment.

WE ALSO BUY AND SELL COMPLETE FOUNDRIES.

EUCLID FOUNDRY & MACHINE EQUIPMENT CO.,
15019 SARANAC RD., CLEVELAND 10, OHIO.
TELEPHONE: GLENVILLE 1-1538, 1-1222.

FOR SALE

1—Wheelabrator, 27 x 36 Tumblast with dust collector complete.....$2400.00
1—Whiting Blower Turbine, as new, CFM 20, HP 220, Phase 3.....$1000.00
7—Osborn Model 275 Jolt Squeeze Machines .....$125.00 ea.
1—20" High Speed Modern Double Spindle Grinder $400.00
1—Demmler No. 55 Core Blower.....$400.00
2—Cleveland Tramrail Cranes 30'..$200.00 ea. (265' of 2500 arch beam..$500.00)
80—Carriers HA ½, new .....50% off list
1—3-way Switch .....$ 60.00
1—Wadsworth Core Making Machine, used twice $100.00
1—Tabor Jolt Roll Over Machine, capacity 25 x 30 .....$250.00

BAMBER FOUNDRY, INCORPORATED
CANAL STREET STAMFORD, CONNECTICUT

TESTING MACHINES

1—Riehle 400,000# hydraulic and beam type Compression Testing Machine
1—Riehle 200,000# Universal
2—Riehle 100,000# Universal
1—T. Olson 100,000#
Also Simpson Sand Mixers 18" dia. Laboratory, #0, #1, #1½, #2, #3
Miscellaneous: Screens, Pulverizers, Grinders, Conveyors—all types, Tyler Rotap Screens, etc.
OUR 36th YEAR

CONSOLIDATED PRODUCTS CO., INC.
13-20 PARK ROW NEW YORK 38, N. Y.
TELEPHONE: BARCLAY 7-0600

PRICED RIGHT FOR QUICK SALE

BUSCH SPRUE CUTTER, heavy duty for steel, 8" throat, capacity 1¾" square, 2½" round, equipped with 7½ HP, AC motor.
INTERNATIONAL CORE BLOWER #SB11, 15" x 24" Table.
MILWAUKEE ELECTRIC HOIST 1 ton capacity, 2 motors, motorized trolley, 10' lift.

GLOBE MACHINERY CO.
602 W. LAKE STREET, CHICAGO 6, ILLINOIS
ANDOVER 3-4185

SAND MULLER FOR SALE

5A Baker-Perkins used 1½ years since new. Taken out of operation July 29. Complete with 125 HP motor, starter, and speed reducer. Force feed oil pump to all bearings. To be sold at 60% of new price or any fair offer. Contact: **DAYTON-PORTSMOUTH FOUNDRY CO., PORTSMOUTH, OHIO, or THE DAYTON STEEL FOUNDRY CO., DAYTON, OHIO.**

FOR SALE

Whiting No. 8 Cupola
New in 1948—used 100 hours.
Cost $7500.00—Take $2500.00

JACK RODEGHIER
712 N. RAYNOR AVENUE
JOLIET, ILLINOIS

FOR SALE

SAND DRYER AND COOLER, Bartlett & Snow rotary, 54" cylinder, 12' length, complete.
2 APRON CONVEYORS, under storage hopper type, 36" wide, 13' centers. Complete with 7½ H.P. motors, Link Belt reducer.
Equipment practically new
Engineering change eliminates use.

ILLINOIS FOUNDRY COMPANY
SPRINGFIELD, ILLINOIS

FOR SALE

Model BG Simplicity Portable Shakeout, 3' x 5' deck size, 5,000 pound capacity, excellent condition. Complete with 7½ HP motor, 220 volt, attached ..... $700.00.

NEENAH FOUNDRY COMPANY
NEENAH, WISCONSIN

QUALITY MACHINERY

Mummert-Dixon 10 HP Swing Frame Type Snagging Grinder
Detroit DHL Hardness Tester
American Wheelabrator 20" x 27" w/dust collector
Bellevue Model 321 Aluminum Melting Furnace

WALTER H. MEYER MACHINERY & EQUIPMENT
2406 WEST VAN BUREN STREET
CHICAGO 12, ILLINOIS

FOR SALE

Baker-Perkins Core Sand Mixer, size 16½, type DIM "Unidor", 30 HP motor drive. Excellent condition. Yours for ONE-FOURTH of cost. Address: Box 697, FOUNDRY, Cleveland 13, Ohio.

FOR IMMEDIATE DISPOSAL

Complete impregnating unit consisting of vacuum tank, storage tank, high vacuum pump, condensor, indicators, connections and two wire baskets. Address: Box 771, FOUNDRY, Cleveland 13, Ohio.

CLASSIFIED ADVERTISING

For Sale

FOUNDRY EQUIPMENT

MOLDING EQUIPMENT

Herman Jolt Rollover #6000, 40" x 60", 1947
2—Herman Jolt Stripper, 48" x 54", 1947

Osborn Jolt Roll Over, model 405S, with Roll out Car 44" x 48"
4—275 J Osborns—late type
1—75J Osborn
10—SPO Squeezers 110J
29—2047-4 Osborns Jolt & Draw
1—558 Osborn Pin Lift
5—Haynes Squeezers
2—Adams 12 x 38 Squeezers
4—Milwaukee Squeezers
1—#332 Osborn Jolt Rollover
2—Int'l. Portable 24 x 30 Rollover

SAND HANDLING EQUIPMENT

Unit A Syntron Feeder Hopper, 6' x 6'
2—Aerator, Overshot type, 9' x 2' & 4' x 3'
Aetna Sperser System
Simplicity Shaker, model C
Belt Conveyor Systems
Simplicity Gyrating Screen 2' x 3'
4—Green Sand Hoppers 4 yd. cap.

CRANES & HOISTS

15—Curtis Traveling Bridges, 15' span
16—Curtis Air Hoist, 5 & 6" Cylinders, 3½' x 4' Lifts
Electrified Monorail

CUPOLA & LADLE EQUIPMENT

Roots-Connersville Blower, 14 x 36, 30 hp., late
Roots Connersville Blower, 22 x 66, 75 hp
#7½ Roots Connersville Blower 13,000 cfm
North American Centrifugal Blower, 3000 cfm
Spencer Turbo Blowers, 2250 cfm @ 16 oz.
2850 @ 16 oz.
#5 Whiting Cupola & Charger
2—#9 Whiting Cupolas
Geared Ladles—1 ton to 4 ton—tilt.

MISC. FOUNDRY EQUPT.

10,000 ft. #458 Chain Conveyor with Trolleys
Brinell-Rockwell-Richie Testers
2—Int'l SB11 Core Blowers
Demmler #1 Core Blower
3—12 x 12 Pangborn Sand Blast Rooms, with Dust Collectors
2—Lindberg Fisher 225 lb. tilting Furnaces & Blowers
1—400# Detroit Electric Furnace
2—6000# Automatic Transporters.
Baker Lift Truck, 6000# cap., 1948
Yale Lo Lift, Redi power
300 ft. 10" Logan Roller Conveyor 3½" Dia.
Logan Wood Slat Conveyor, motorized, 36" x 35' Roller Conveyor
15—Double End Grinders
#124 Gardner 53 Horiz. Grinder
1—U. S. Double End Grinder—Late
1—Standard Buffer & Polisher
Tons of Flasks 12 x 18 to 48 x 120
Core Blower, Champion, model CB400, 300 lb.
Roto-Clone units, 24W & 36W, with sludge ejectors
Vibrators, Osborn, 1⅝" x 2"
Welded Steel Pouring Crucibles, new, 1700#
2—McLeod Tumbling Barrels
Bottom Dump, Sand Buggies
Exhaust Fans—to 60"
Fire Extinguishers—CO2
Exhaust Blowers—all sizes

WE WILL BUY—FROM 1 PIECE UP TO ENTIRE FOUNDRY

GREENE BROTHERS
(FORMERLY ASSOCIATED WITH ALLIED MATERIALS HANDLING CO.)
511 FREEMAN AVE.
CINCINNATI 3, OHIO

For Sale

FOR SALE
SAND BLAST EQUIPMENT

Just released 6 Wheelabrators Tumblast, six 48 x 42. Your pick $3000.00
Wheelabrator size 48 x 48. Like new. $5250.00.
Wheelabrator Tumblast 36 x 42. $4500.00.
Wheelabrators Table Blast 8 and 10 ft. $3000.00.
Pangborn Table Blast 10'. $3000.00.
Sand Blast Cabinets, pressure tanks, dust collectors and blowers. All sizes.
Contact us for your sandblasting needs or any surplus sandblasting parts and equipment you have for sale.
Will accept your small machines as trade in on any of the above equipment.

DIAMOND SAND BLAST, INC.
5654 WEST JEFFERSON
DETROIT 9, MICHIGAN

FOR SALE

1—Moulder's Friend Sand Cutter, purchased new May, 1951 and used until September, 1952. Reason for selling—changed method. Serial #148, 60" wide, includes spare brush and parts $1,000.00
2—Haynes Portable Jolt Squeeze Molding Machines .....$100.00 ea.
4—#R-7 Rapid Jolt Squeeze Molding Machines, inverted to portable machines.....$60.00 ea.

TIOGA FOUNDRY CORPORATION
OWEGO, NEW YORK

FOR SALE
DETROIT ELECTRIC FURNACE

Type AA of 1,200 lb. cold metal or 2,600 lb. hot metal capacity, complete with mechanical and electrical equipment for melting and rocking, including oil filled transformer of 11,000 v. primary and 125 v. secondary. Presently crated but available for inspection on 48 hours notice. Ideal for high test cast irons, brasses or bronzes. Price: $9,500.00. Address: **HOPE ELECTRICAL PRODUCTS CO., 338 WILSON AVENUE, NEWARK 5, N. J.**

FOR SALE

One—Dwight-Lloyd Sintering machine. Capacity 1½ to 2 tons per hour, can be increased. Reasonable.
One—#8 Whiting Cupola Furnace with Whiting-Spencer #22100 Blower and Foxboro Automatic air weight control. Furnace has never been erected or used. Priced below list for quick sale.

CALL LANSING 980 OR WRITE TO:
INDUSTRIAL WASTE MATERIALS CORP.
P.O. BOX 7 LANSING, ILLINOIS

FOR SALE

Complete patterns, master patterns, jigs and fixtures, etc., for manufacturing two sizes jolt squeezers. A good supply of repair parts for these squeezers and a number of squeezers made up ready for sale.

BOX 788
FOUNDRY CLEVELAND 13, OHIO

FOR SALE

One—30" x 40" Tabor Shockless Jar Rollover Machine—with plate and quick changeover clamps.
Used less than three months, actual operation.
Excellent condition—priced to sell.

PHILLIPS FOUNDRY CO.
P. O. BOX NO. 82
BAKERSFIELD, CALIF.

FOR SALE

Milwaukee Jolt Rollover Draw Molding Machines. New 1944. 12" draw, 1200# and 1500# capacity. Address: **GARDEN STATE MACHINERY CORPORATION, 59 EDISON PLACE, NEWARK 2, NEW JERSEY.**

FOR SALE

1—No. 3½ Cupola, complete with skip charger and 20 HP direct connected blower. Almost new condition, reasonably priced. Address: **FERRO-CAST CORPORATION, ZEELAND, MICHIGAN. PHONE 2130.**

PNEUMATIC TOOLS FOR SALE

(7) Chicago Pneumatic air rammers. (4) Chipping hammers. (2) Small hand grinders. Most of these tools have never been used. Address: Box 777, FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE
FURNACES

4—Hausfeld Tilting Furnaces, oil fired, with blowers, 150 and 200 crucible.
2—Ajax Induction Aluminum Furnaces, 400# capacity, one holding, like new.
2—Hausfeld Magnesium Tilting Furnaces, 1200# capacity. Lined.
7—Monarch #93 Barrel Type Furnaces with blowers. 1000# alum. 3000# brass.
1—#8 Whiting Cupola with GE Turbo Blower and Controls

BLOWERS

2—Spencer Turbo Blowers, 40 HP motor, 3600 CFM at 24 ounces.

SAND HANDLING EQUIPMENT

1—Tractor type Sand Slinger, 16" head, hyd. turning device, mag. separator.
1—Beardsley & Piper Tractor Sand Slinger.
4—Sandcutters, 48", 70", 76", and 80" cutting reels.
1—Jeffrey conveyor, 28' long, 20" belt, troughing Idlers, 5 HP motor and red.
1—50' long Conveyor, 19" wide belt, with motor and drive.

CLEANING EQUIPMENT

1—Pangborn #45, Type "M" Blast Room with collector.
1—Cyclone Dust Catcher, 10' diameter, 22" outlet, like new.

MOLDING MACHINES

14—Osborn #275J Portable Cantilever Jolt Squeezers.
2—Osborn #405 Rollovers.
1—Osborn #243 Rollover.
4—Osborn #276PJ Stationary Jolt Squeezers.
1—International Rollover, Model AN 1212, Ser. #45373, 30 x 16".
3—International Type "G", portable, 24" table, 10" draw.
1—Johnston & Jennings #918 Rollover Molding Machine.
1—Johnston & Jennings #815B Rollover.
1—Davenport #28A Rollover, max. flask 36 x 60", 12" draw, 28 x 44" table.
3—Herman Rollovers, 2—40 x 60", 1—60 x 80" tables.

LADLES

2—4 Ton Teapot Worm Geared Ladles.
2—"U" Type Modern Worm Geared Reservoir Ladles, 3000# cap. 34 x 60" I.D.
4—10 & 15 Ton Bottom Pour Steel Ladles.

OVENS

1—2 Compartment Foundry Equipment Oven, 12' D, 12' W, 7' H, gas or oil.
1—Mahr Heat Treat Oven, 8' wide, 3' deep., oil fired, side charge.
1—Probeck #C-3C Drawer Type Gas Fired Core Oven.

AIR COMPRESSORS

1—40 HP Sullivan Air Compressor, Model B-B1M #8, Serial No. 21661.

MISCELLANEOUS

1—DeWalt Cut-Off Saw, 10 HP, 3/60/220-440 Volt.
1—Truelift Truck, Ser. #29114, Type 700, Capacity 2000#.
1—Barrett Boring Mill, 27" swing, 7½ HP motor.
1—Howe Weighograph, 39 x 39", platform, 3000# capacity. Electric.

We have 200 Tons of Cast Steel, Structural Steel, and Sterling Type Floor Flasks, excellent condition. Send for Complete List #53-7.

UNIVERSAL MACH. & EQUIPMENT CO.
320 EAST BROAD STREET
SHILLINGTON, PENNA.

PHONE READING 3-0311, 4-0146, 3-1021
R. B. HARRISON, FDRY. MGR.
J. P. IRWIN, FDRY. ENGINEER

FOR SALE

1—Type F International Jolt Rollover Air Draw Molding Machine with 31 x 54" table, 16" draw, 2500 lb. capacity. Equipped with air flask clamps and automatic leveling bars. Good operating condition. Address: J. F. QUEST FOUNDRY CO., 900 SOUTH 4TH ST., MINNEAPOLIS 15, MINN.

Thanks! We're Going Great Guns!

TO THE FOUNDRY INDUSTRY:

Your response to last month's ad was so great, that it has prompted us to purchase many additional pieces of equipment to help serve you better.

A.A.A. MACHINERY & EQUIPMENT CO.

MOLDING MACHINES

10—**OSBORN** #559 HO Jolt Strippers, stationary, Table 25" x 30", Jolt 1200 lbs. cap.
1—Osborn #333 H Jolt, Squeeze, Power Rollover, Pattern Draw, 2000 lbs., Jolt, 22" x 44" Table Jolt Cylinder 12", Draw 22", Squeeze Cylinder 18".
2—Osborn #332 Jolt, Squeeze, Rollover, Pattern Draw, Draw 9", Flask Size 25" x 36".
1—Osborn #816 Jolt Squeeze Stripper, Squeeze Cylinder 16", Jolt Cap. 1000 lbs.
6—Osborn #2047 Jolt Rollovers, 8½", Draw, Flask Size 22" x 16" x 10⅛" deep, 600 lbs. cap.
5—Osborn #275 J Jolt Squeeze Molding Machines.
4—Osborn Model #814-P, Jolt, Squeeze, strippers.
5—Osborn #601-13, Jolt, Rollover, Pattern Draw, 600 lbs. cap., Flask Length 30".
2—Osborn #405, Jolt, Rollover, & Pattern Draw, Flask Size, 64" x 57", Jolt Cap. 3000 lbs.
5—Osborns #2047-4, Jolt, Rollover, Pattern Draw, Flask Size 22" x 16" x 10", 8½ Draw, 600 lbs. Jolt Cap., Power Rollover.
*2—Osborn #331 Jolt Rollover, Squeeze and Pattern Draw, Squeeze cylinder Diameter 13", Table Length 30".
*6—Osborn Jolt Squeezers #75J, Serial #6277Y.
*2—**JOHNSTON & JENNINGS** Model 918, Jolt Rollover and Pattern Draw, Table Size 44" x 54, 20" Draw.
1—Johnston & Jennings Jolt Squeeze Molding Machine, Serial Number 20873194.
*2—Johnston & Jennings #815, Jolt Rollover and Pattern Draw, Table 30" x 40", Pattern Draw 15", Cap. 1200 lbs.
*1—Johnston & Jennings Stationary Jolt Bin Lift Machine, Model 1216S, Table Size 36" x 54", Pattern Draw 16", Cap. 3000 lbs. Maximum Flask Size 48" x 60", Jolt Cylinder Dia. 12", Draw Cylinder 6".
*1—Johnston & Jennings Stationary Jolt Pin Lift Machine, Model 812S, Table Size 30" x 38", Pattern Draw 12", Capacity 1600 lbs. Maximum Flask Size 36" x 42", Jolt Cylinder Dia. 8", Draw Cylinder Dia. 5".
*3—**INTERNATIONAL** Model PKL, Jolt, Squeeze, Air Pin Lift Machines, 18" x 24" Table, Lift 5½", Squeeze Cylinder, 12".
1—International Pushoff Stripper, 42" x 26" table, 6" Draw.
5—International Type "R" Hand Ram, Hand Turnover, Foot Draw Machines, various Sizes.
*2—International Type "RJ" Jolt Ram, Hand Turnover, Foot or Hand Lever Draw Machines, Various Sizes.
*3—International Type JFL, Jolt Ram, Foot Lever, Pin Lift, Various Sizes.
*2—International Type RES, Jolt, Squeeze, Rollover, Draw Machines, 15" x 8".
*1—International Type G, Air Jolt, Air Turnover Foot Draw Machine, 20" x 8".
*1—International Type G, Air Jolt, Air Turnover Foot Draw Machine, 30" x 8".
*1—International Type IJSD—14, Jolt Squeezer—Double Squeeze Head, 16" x 20" table.
*1—International Type F, Jolt Rollover Air Draw Molding Machine, 31" x 54" table 16" draw, 2500 lbs. cap., with air flask clamps, automatic leveling bars.
*2—**DAVENPORT** Model SA-34, Jolt Rollover, and Pattern Draw, 2500# Jolt Cap., 15" Draw, 34" x 48" Table, Flask Max. 36" x 64".
*2—Davenport Model SA-28, Jolt Rollover, and Pattern Draw, 1500# Jolt Cap., 12" Draw, 30" x 40" Table.
*2—**TABOR** Jolt Rollover and Pattern Draw, Draw 10", 600 lbs. Cap.
*2—Tabor, Hand Rollover, Hand Jolt Machines.
*1—Tabor Jolt Rollover Pattern Draw, 30" x 40" Table, Draw 12", cap. 1000 lbs., Maximum length of pattern 53", minimum length of pattern 20", Table length 40", table width 30", height of flask 20½".
3—**MILWAUKEE** Model 123-13, Jolt, Squeeze, Machines, 12" cylinder, 17" x 26" table.
4—**CHAMPIONS** Pushoff Strippers, 42" x 26" table, 6" Draw, Serial #5413, 5415, 5416, 5417.
*1—Champion Jolt Squeezer, Portable, Size JS-10-P, Serial #5770, Table Size 18" x 21".
*1—Champion Power Jolt, Hand Turnover, Foot Draw Machine, 13" x 17" table, Model #JM 16, Serial #5092.
*1—**HERMAN** Rollover, Jolt, Pattern Draw, 6000 lbs. Table Size 42" x 90".

*** JUST ARRIVED**

GRINDING EQUIPMENT

1—Besley Dry Grinder Model #372, Circular Shape, Size 53" Morton 20MT4 abrasive disc, Serial 283442, Motorized 20 H.P. Howell, 1943 Machine, used 1 year.
1—Hammond Model WR—1 Double End Grinder, Snagging, 7½ H.P. 220/440, 60 cycle, 3 phase, 1943 Machine.
2—Hammond Model WH—10 Double End Grinders with (2) 7½ H.P. 220/440 V. Motors, Wheel Size 20" x 2" x 2", Serial #7239, 7240.
2—U. S. Electric Model 20 Double End Grinders, 5 H.P. 220/440 V., Wheel size 20" x 3" x 2".
1—Queen City Model 100 Double End Disc Grinder with 10 H.P. 220/440 Volt Motor, Size 20" x 2" x 2", Very Late Machine.
4—Mummert Dixon Swing Grinders, 10 H.P. 220/440 Volt Motor, Model #2016, 20 x 3 x 10 Wheels.

SAND EQUIPMENT

2—Beardsley-Piper Model "S" Screenarator, portable, Pneumatic tires, Serial #SS-2902-4710.
2—Royers #2, Sand Conditioners, Port., 15 TPH.
*1—Royer #NDP Sand Conditioner, Port., 25 TPH.
2—Royers #NDS 42, Sand Conditioners, Stationary, 25 TPH.
1—Jeffrey Type "P" Sand Conditioner, Class B Mixer, Portable Type, Serial #377.
1—American Sand Cutter, Model AM, Size 69 x 45, 1945 Machine.

MELTING FURNACES

2—Fisher Melting Furnaces, Model MNP, Gas Fires, Nose Pouring, 1700 lbs. Capacity Aluminum, Electric Tilting.
1—Holding Furnace, 300 lbs. Cap.
*1—Hausfield, Tilting Furnace, 500 lbs. Cap. Nose Pouring.

HEAT TREAT FURNACES

1—Eclipse Gas Fired Furnace, 4 burners, 18" x 20" x 60" inside dimensions, with motors and blower, 1944 Machine.
1—American Gas Furnace Model DC, 10" x 16" x 26" inside dimensions, 1600 degrees to 2350 degrees F.

MULLERS

1—Simpson #2 Sand Muller. Complete with skip hoist, motor & drive. Open Gear Type.
1—Beardsley & Piper #30 Speed Muller. Complete with skip hoist, motor & drive.
*1—Simpson #3 Sand Muller, Open Gear Type.
2—Beardsley & Piper #70 Speed Mullers.

SAND SLINGERS

*3—Beardsley & Piper Stationary Sand Slingers, 16" Head.
*1—Beardsley & Piper Stationary Sand Slinger, 19" Head.

CORE OVENS

1—Coleman Core Oven, gas fired, 4 doors opening into single compartment, 42" wide, 50" high, and 31" deep, adjustable trays on 3" centers.
1—Coleman Core Oven, Gas Fired, 15' x 10' x 8', drawer type.
1—Young (3) Compartment Pull Drawer Oven, FOR MAGNESIUM, each compartment 6'6" wide x 5'9" deep, x 7' high inside, (3) Drawers to compartment. Electric heating for temperature of 800°. FOR HEAT TREATING, DRAWING OR STRESS RELIEVING.

CORE BLOWERS

1—Osborn #91 Core Blower, Serial 10050—F.
2—Osborn #92 Core Blowers, Serial #9703A & 8692-C, Air Clamps.
1—Demmler #3—E Core Blower.
*1—Demmler #2 Core Blower, Air Clamps.
2—Redford Bench Type Core Blowers.

SAND BLASTING EQUIPMENT

1—American Wheelabrator Tumblast, Belt Type, 15" x 21", 1 Cubic Foot Cap., with dust collector elevator, Serial #A70074.
1—Tumbling Barrel 28" diameter, 40" long, equipped with 7 H.P. Motor, Speed Reducer.
*1—Pangborn Rotoblast Rocker Barrel Cleaning Machine, Model #28, type GK-2, cap. cubic feet per charge, with loader a electrical equipment.

*** JUST ARRIVED**

LIFT TRUCKS

2—Baker Raulang Electric Fork, 4000 lb cap., 119" lift, Used 1 mo. Like New!
1—Automatic Platform Lift Truck, 3000 lbs cap. lift 6', battery operated.
1—Yale & Towne Platform Jitney, Electric gasoline generating, 6000 lbs. cap., 1-36 Volt Ready Power Unit, Serial #5516.
5—Lewis Sheppard 4000 lbs. cap., Jack Lift Trucks, hydraulic, 1950 models, 28" x 40", will take 10", 11" or 12" skid.
1—Ready Power Unit, 6 cylinder, 36 volts.
*1—Automatic 10,000 lbs. platform Low Lift with Ready Power Unit.

SHAKEOUTS

2—Simplicity Shakeouts, 3' x 3', Serial #33—SOS—106, Model S, 1000 lbs. Cap.
1—Simplicity Shakeout, 4' x 6', Model D, 16,000 lbs. cap., 10 H.P. Motor.
1—Simplicity Shakeout, 5' x 7', Serial #57—SOBG—185, Model BG, 5000 lbs. Cap.
1—Simplicity Shakeout, 4' x 6', Serial #46—SOB—145, Model B.
2—Simplicity Shakeouts, 4' x 8', Serial #48—SODE 104, Model DE, 16,000 lbs. cap.
1—Robbins 4' x 10', Floatex Model, Serial F-609, with 7½ H.P. motor & V-belt Drive.
1—Robbins Gyrex 4' x 8', 3 deck unit.

AIR HOISTS

7—Ingersoll Rand, Size D, 4000 lbs. cap., complete with low overhead trolley.
2—Ingersoll Rand, Size E, 10,000 lbs. cap., complete with low overhead trolley.
1—Ingersoll Rand, Size D-6, 6,000 lbs. cap.
3—Ingersoll Rand Size B, 1000 lbs. cap.
1—Ingersoll Rand, Size C, 2000 lbs. cap., not low head room.
1—Little Giant, Model A, 1000 lbs. cap.
4—Thor Pneumatic, 1000 lbs. cap. low head room.

ELECTRIC HOISTS

1—Shaw Box Load Lifter, 4000 lbs. cap., 440 V. 3 ph, 60 cycle, NEVER USED, LIKE NEW. Serial #H36777, Motor #FM8396.
1—Tramrail, 1000 lbs. cap. with trolley, 220V, 3 phase, 60 cycle.
2—Yale & Towne, 2000 lbs. cap., heavy duty, 220V, 3 phase, 60 cycle, totally enclosed motors, explosion proof, completely rebuilt, 1 with powerized trolley.

TESTING EQUIPMENT

1—Gogan Brinnel Testing Machine, 3000 KG, 1945 Machine, Never Used.
1—Riehle Tester, 100,000 cap. Screw type.
1—Riehle Tester, 150,000 cap., Screw type.

LADLES

1—Whiting Ladle 20 tons, tilting, totally enclosed gearing, nose pouring.
1—Whiting Ladle, 2 tons, tilting, totally enclosed gearing, nose pouring.
1—Barrel type Pouring Ladle, 300 lbs. cap.
2—Ladle Hoists, Hand Operated, 500 lbs. cap.

CONVEYORS—Apron • Roller • Belt

1—12' Powerized Belt Conveyor, 24" belt.
1—18" x 24' Apron Conveyor, Steel Link Belt, complete with motor and drive.
1—24" x 20' Apron Conveyor, Steel Link Belt, —Less motor and drive.
1—Pig Mold Conveyor (Link Belt) 74' long, with drive, for aluminum and magnesium.
*1—Plug Mill, 42" x 96", Link Belt.
80'—24" Above Rail Roller Conveyor, 1½" Rollers, 8" centers, in 10' sections.
2000'—20" and 24" ABOVE RAIL CONVEYOR, 2½ ROLLERS ON 4" AND 5" CENTERS, HEAVY DUTY EXCELLENT CONDITION.

BLOWERS

2—Spencer Blowers 5400 CFM, 16 ounce, with 40 H.P. motor.
1—Spencer Turbine Cupola Blower 16 ounce with 50 H.P. Motor.
*1—North American Turbine Blower, 24 ounce, 1900 C.F.M. with 20 H.P. motor.
*3—Blowers for furnaces, 16 oz., 3 H.P. mtr.

SCALES

1—Howe Platform, 6000 lbs. cap. 3' x 4' platform.
*1—Toledo Platform, 6500 lbs. cap.
*1—Car Scale, mfg. Atlas Car & Mfg. Co.

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FOR SALE

AIR COMPRESSOR
Ingersoll Rand Type 10—14 x 9 x 12, 2 stage, 75 HP, 3/60/220/1200 rpm motor, 350 CFM at 100#.

BLOWERS
Spencer Turbo Blower 2250 CFM @ 16 oz., 15 HP, 220/440 V motor. New 1946.
Ingersoll Rand SF24.

CORE BLOWER
Demmler #3E Dropaway Draw, New 1946.

CRANES
5 Ton P & H Overhead Elec. Traveling Crane, 30'6" span, 15' lift (can be increased) 3 motor, 220 V A.C. New 1946.
5 Ton P & H Overhead Electric 20'5" span, electric hoist, hand travel both ways, P/B control 440 V A.C.
10 Ton Northern Overhead Elec. Traveling Crane, double girder, fish belly, 3 motors, 230 V D.C., 54'7½" wide C to C of wheels can be cut down to fit smaller size.

CRUSHERS—PULVERIZERS
2—Stedman 15" x 12" Type A. One with 10 HP 220-440 V motor. One without motor.
7—Prater Blue Streak Pulverizers, 30 HP motor.

ELECTRIC FURNACES
2—Detroit Elec. Rocking Type, 300# heat transformers and one with extra shell.

GRINDERS
Fox 10 HP 3/60/220 V Swing Frame.
U. S. 15 HP, 3/60/440 V Swing Frame.
Hammond 7½ HP, Type W.H. High Speed, 2" x 20" wheel.
McCabe High Speed Double End, 2" x 24" wheels.
Ransom S B Double End 2" x 20".
Fox 15 HP Swing Frame.

HOISTS
Ingersoll Rand 4000# Type D Air Hoist, late type.
500# American LoHed.
1000# Cleveland 220/440 V.
1000# Detroit 220/440 V.
5—1000# P & H Hevi Duty with trolley.
2—2000# P & H Hevi Duty with trolley.
2000# Detroit Electric.
2000# American LoHed.
11—4000# P & H Hevi Duty with trolley.
2—4000# P & H Hevi Duty with trolley and powered drive unit for moving hot metal.

LADLE
3 Ton Whiting geared ladle. Like new.
5 Ton Whiting Mixing Ladle on wheels.

MAGNETIC PULLEY
Perma-Mag 18 x 18.

MOLDING MACHINES
1—Champion Pin Lift Pushoff, 44" x 44" x 12".
2—Champion Pin Lift Pushoffs, 46" x 46" x 12".
1—Champion Jolt Squeeze Strip Molding Machine, column type, 12" jolt cylinder 8" lift, 18" x 21" table.
1—Champion 24 Hand Clamp rollover 26" x 16" table.
1—Herman 20" x 30" Rollover Pattern draw 6" bumper.
1—Herman 4000# High Speed Rollover 30" x 60" with 32" x 48" bumper, 13" cylinder pattern device.
2—Herman 20" x 24" Jolt Rollover Pattern Draw, Like New.
1—Osborn 601-13 Portable Jolt Rollover Pattern Draw, 30" x 24" flask size, 10" draw, 900# cap.
1—Molding Unit, consisting of Osborn 23" x 24" table, Jolt squeeze and Osborne 17" x 24" 814P Rollover with overhead hopper for each machine, 1 with bottom dump, other with flat belt sand delivery.
1—Tabor, 1000# Rollover 30" x 5', Excellent condition.
5—International Type G.

MULLERS
Simpson #1.
Simpson #2, bucket loader, motor on base plate.
Simpson #3, motor on base plate.
Simpson #3, Type H.
Clearfield #404, 5 HP 440 V motor.
Kwick Mix Paddle type portable.

ROD STRAIGHTENER
Pneumatic Guillotine Type.

ROTOCLONE
Size 24, Serial 9747 with chain type ejector, 40 HP, 3/60/220 V motor.

ROTOBLAST
Pangborn, table with 3-8" rotating work tables, 3 position loading, cleaning and touch-up designed for work similar in size to aircraft cylinders. Like New condition.

SHAKEOUTS
1—3' x 5' Link Belt.
2—4' x 6' Simplicity.

SLINGER
B & P Motive Type, 19", two speed head, 25 HP. Perma Magnet, bucket elevator to load tank, storage bin with conveyor to elevator.

TUMBLING BARRELS
We are now dismantling a sand preparation unit at Baltimore for sale by the piece.
21' x 24" Belt Conveyor, 5 HP Syncrogear motor drive.
46' Bucket Elevator 8" x 12" buckets, 7½ HU Syncrogear drive.
46' Bucket Elevator 8" x 12" buckets, 7½ HP Syncrogear drive.
48' Bucket Elevator 8" x 12" buckets, 7½ HP U. S. Motor, Falk Drive.
32' Bucket Elevator 8" x 12" buckets, 7½ HP U. S. Motor, Falk Drive.
Rotary Screen 5 HP U. S. Syncrogear Motor.
Hopper 10' x 15' x 14' deep, 3 bottom gates bolted construction.
17' x 9' Flat Belt conveyor with Magnetic Pulley.
Hopper 13' x 15'-20' deep bolted construction.
19" x 34' trough belt, belt drive, less motor.
20" x 16' Flat belt conveyor, less motor.

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Dear Reader:

The foundry industry has lost an ardent spokesman and a progressive leader with the untimely death recently of Max Kuniansky. Executive vice president of Lynchburg Foundry Co., Max was one of the country's best known foundrymen and a speaker of engaging person-

MAX KUNIANSKY

ality.

We recall hearing him for the first time at a special AFS annual meeting held at the Palmer House in 1945, a year in which wartime restrictions on civilian travel resulted in cancellation of that year's foundry convention. Scheduled to discuss "Castings in the Postwar Industry," Max closed a long meeting with remarks which excited all who heard him.

In a few well-worded sentences in that delightful Virginia-accent for which he was famous, Max described a quarter-century's progress of the foundry industry. He warned of the need to educate the public on our industry and its significant stature in our economy. He cited his consternation at being asked by the executive of a large plant why foundries still made castings in *dirt*. "Man, those aren't piles of dirt," said Max. "They're heaps of molding sand!" Max thought it was about time the foundry industry looked to its public relations. His contribution to foundry industry progress was considerable.

If you will go back to your files of back issues of FOUNDRY, you may read Editor Frank Steinebach's editorial on this now famous occasion as it appeared on page 83 of our September 1945 issue.

—o—

Suggestion: We have just read something which excited our enthusiasm—we hope you'll read it, too! We refer to James H. Smith's discussion of *"Outstanding Opportunities for the Foundry Industry"* which

(Continued on next page)

(*Continued from page* 339)

appeared in last month's (August) issue. This is the report of the fine talk which generated so much interest at the recent American Foundrymen's Society national convention in Chicago. The sentences below concluded a truly great presentation of a subject of timely interest to all associated with the metal casting industry.

> **I look forward with a great deal of optimism to the future. In our hands lie outstanding opportunities for the foundry industry. This great industry of ours in future years will have engineering markets and stature in the economy of America in direct proportion to what we men in the industry today do in the years immediately ahead of us. We have been told that the future of the foundry industry is bright, but it can only be so as a reflection of our own endeavor. This responsibility is entirely ours, both individually and collectively: If we meet these responsibilities and take advantage of our opportunities, we cannot help being successful in this very interesting and dramatic business.**
> **—James H. Smith**

Mr. Smith is General Manager, Central Foundry Division, General Motors Corp.

—o—

56 years with SMOOTH-ON: We reproduce the advertisement of the Smooth-On Manufacturing Co., as it appeared on a full page in our November 1898 issue. During the over-

a-half-century it has been our pleasure to serve this FOUNDRY advertiser, Mr. Vreeland Tompkins, founder of the company, has been active in its management. The son of a foundryman, Mr. Tompkins originated his company's products in 1895. He recently retired as president, is now chairman of the board and has been succeeded as president by Henry M. Silver.

Business Manager

for casting
ALUMINUM BRONZE
MANGANESE BRONZE
SILICON BRONZE

FOSECO
ALBRAL
TREATMENT

efficient—simple operation
produces better castings
at lower cost

Rejected castings are costly in time, money and effort. Sound castings mean sound business for you. FOSECO ALBRAL added to Aluminum, Manganese and Silicon Bronzes will help you obtain perfect results from these normally difficult casting alloys.

PREVENTS FORMATION OF OXIDES *ALBRAL reduces melting losses, keeps crucibles and furnaces clean.*	**DOES NOT AFFECT COMPOSITION** *ALBRAL removes oxides only, does not change alloy content.*
DISSOLVES OXIDES AND NON-METALLICS *ALBRAL increases fluidity, prevents misruns, eliminates inclusions.*	**PREVENTS ABSORPTION OF GASES** *ALBRAL improves mechanical properties and increases pressure tightness.*

TRY FOSECO ALBRAL AT OUR RISK!

You be the judge. Order a 50 pound trial of FOSECO ALBRAL today. Use it in your own foundry. If not completely satisfied with the results, tell us—and we will cancel the invoice. You can't lose—so order today!

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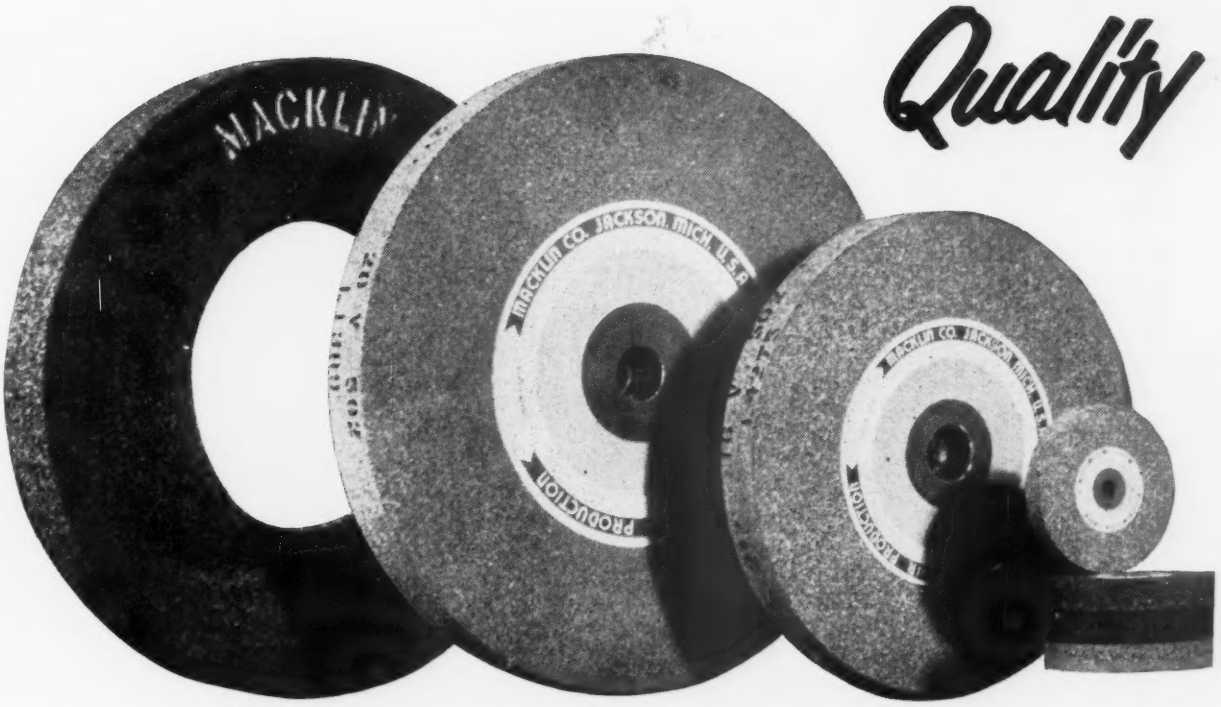
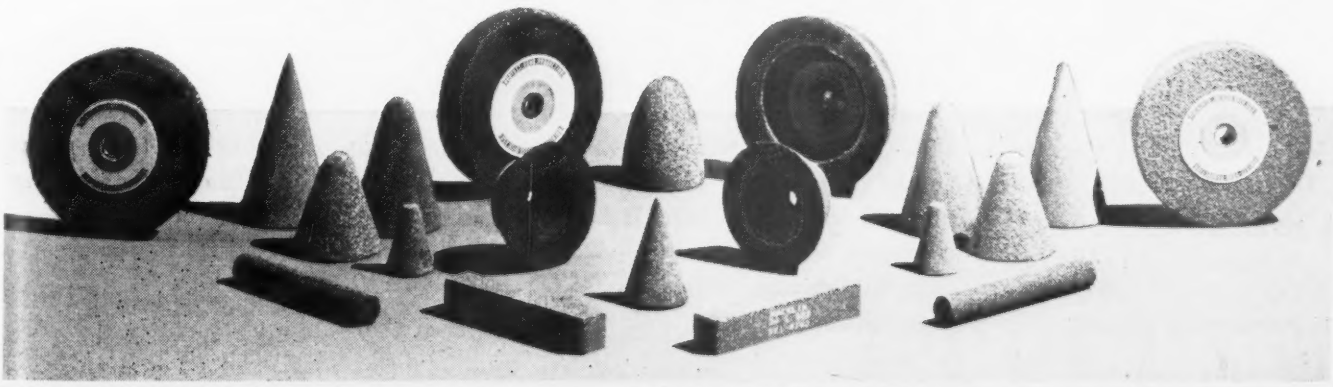


Macklin will solve your grinding problems whether they are portable, swing frame or stand grinding. Available in all sizes and shapes, in grains and grades to meet your particular needs, Macklin grinding wheels will "Protect your Production", with cool, fast, economical cutting action.



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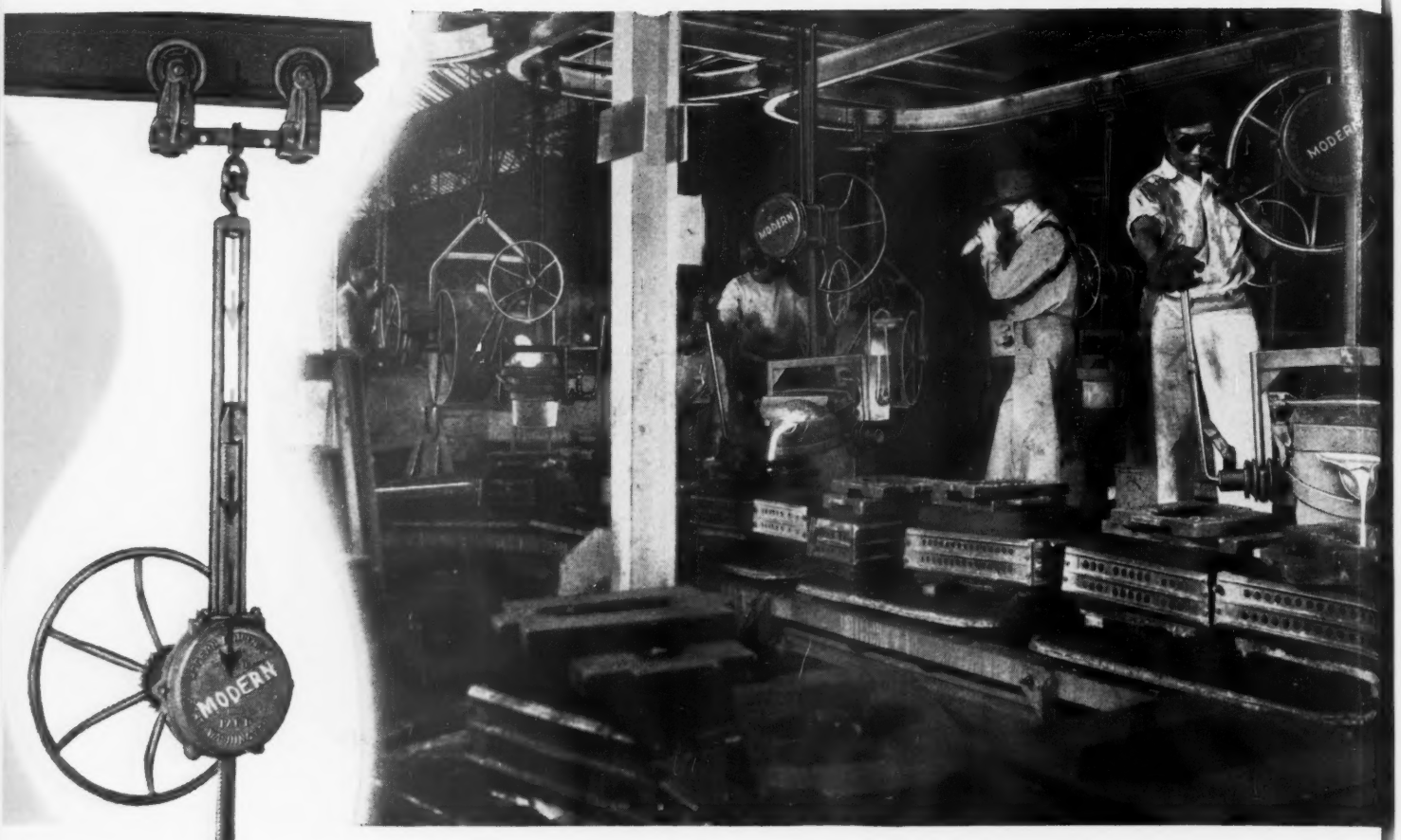
A LIFT *for your* POUR-OFF-MEN



Rigid, straight-line control from monorail to ladle spout for quick accurate spotting over the sprues.

WORKING TOGETHER WITH PRACTICAL FOUNDRYMEN...

MODERN engineers developed the Pouring Device. That's how our business began!

Today this MODERN one-man-pouring method, as proved in a quarter century's service to foundries, is highly productive — both for the foundry that sets up a floor or two a day, as well as for the large manufacturer* with his most elaborate, double-loop conveyor system.

The MODERN cylindrical ladles, together with their 2000 pound loads of gray iron, are trucked from the cupolas to the pouring floor. In this MODERN equipped operation up to 70 tons of tractor cylinder liners, heads and manifolds are poured in an 8 hour shift. Several of the ladles and the MODERN "FA" Pouring Devices have been in operation since 1938. Herein is a timely story on the effective distribution of manpower. You can read more about it in catalog 147: It's free to foundrymen who make request on their company letterheads to — Dept. F-9, MODERN EQUIPMENT COMPANY, Port Washington, Wisconsin.

*Allis-Chalmers, Milwaukee

MODERN EQUIPMENT CO.
PORT WASHINGTON, WISCONSIN

OTHER FREE CATALOGS

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Cupolas and Chargers . . . . No. 147-A
Monorails, Cranes, Switches . No. 150

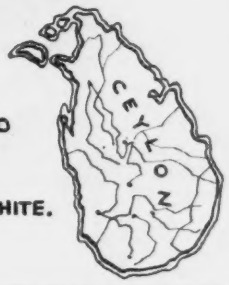
"Facing" Facts

FROM STEVENS FACING DEPARTMENT

... THEY'RE BOTH GEMS!

DIAMONDS ARE A CRYSTALLINE FORM OF PURE CARBON, AND STEVENS PLUMBAGO IS MADE FROM CRYSTALLINE CARBON THEY'RE BOTH GEMS!

CEYLON
THE WORLD'S *FINEST* GRAPHITE FOR PLUMBAGO IS FOUND IN CEYLON ...AND STEVENS USES CEYLON EAST INDIA GRAPHITE.



FUSION POINT UNKNOWN!
THE HOTTEST BLOWTORCH CAN'T MELT STEVENS PLUMBAGO. IT WITHSTANDS HEAT ABOVE 6300°F.!

28 TIMES AROUND THE WORLD!
STEVENS SOLD ENOUGH PLUMBAGO LAST YEAR TO COAT A 3-LANE HIGHWAY CIRCLING THE GLOBE 28 TIMES!

PLUMBAGO DICTIONARY!
PLUMBAGO... KNOWN FOR HUNDREDS OF YEARS... HAS HAD MANY NAMES. "BLACK LEAD," "POTELOT," "GRAPHITE," "CARBO MINERALIS," "CRAYON NOIR". NO MATTER WHAT IT'S CALLED... STEVENS PLUMBAGO CAN DO THE JOB.

THE WORLD'S FINEST GRADE.. ..STEVENS PLUMBAGO!

For over 50 years Stevens Ceylon East India Plumbago has been a foundry favorite. And no wonder! Here are just a few of its many foundry uses. It can be:

- **Used dry as a mold coating**
- **Mixed with molasses water and used as a mold wash**
- **Added to core washes to increase heat resistance**
- **Used as an additive to sand, to give a heat resistant coating on each sand grain**

Why not let versatile Stevens Ceylon Plumbago improve the quality of your castings. Send us information on your particular operation . . . we'll send correct working samples of Stevens Plumbago and a copy of Stevens Technical Bulletin F-107, "The Use of Plumbago." FREDERIC B. STEVENS, INC., DETROIT 16, MICHIGAN.

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Cleveland, Ohio • October 19-23
Booths 2547-55

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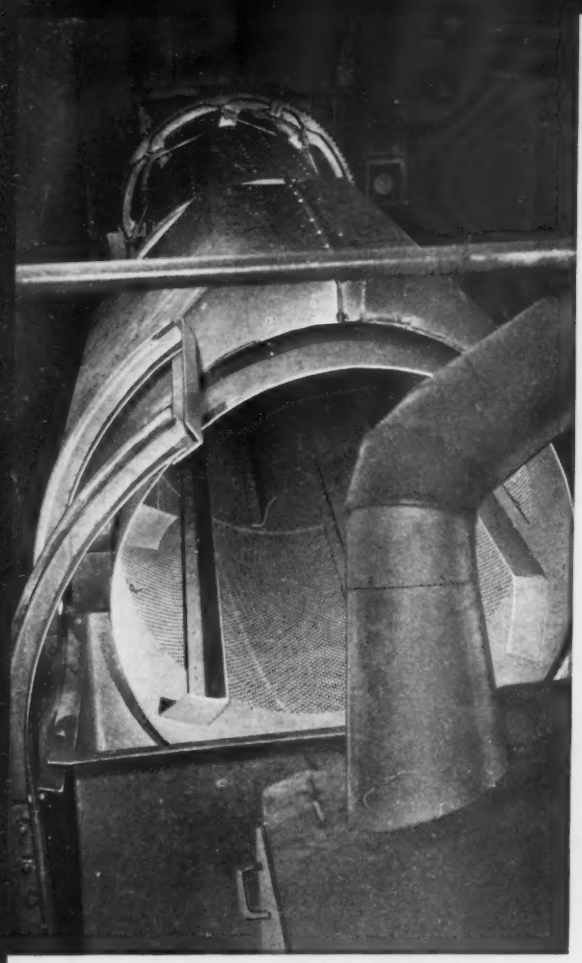
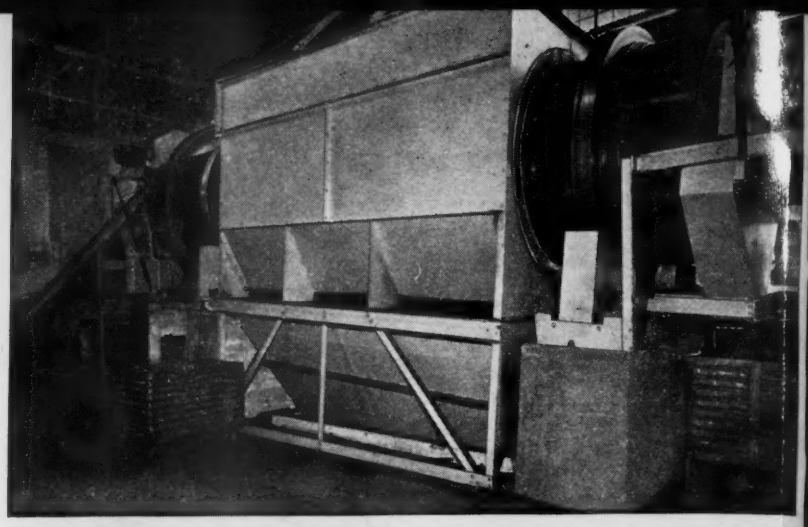
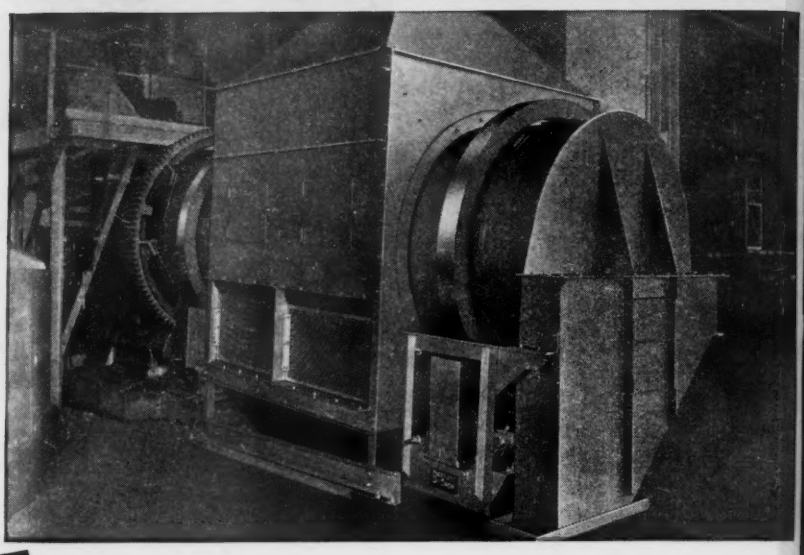
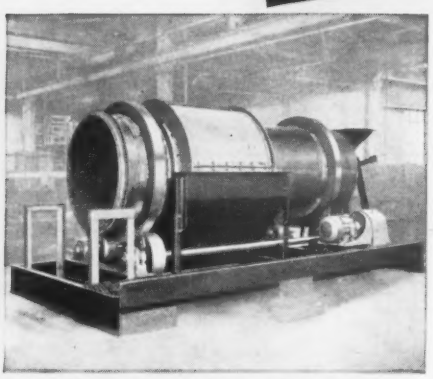




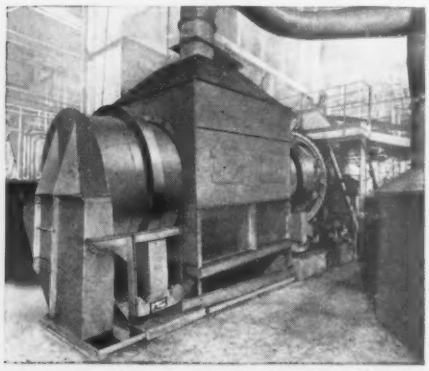


Above: Rotary Sand Cooler and Scalping Screen Handling 1200° F. Shakeout Sand. *Upper Right:* Rotary Cooler Screen with Exhaust Hood. *Lower Right:* Rotary Cooler Screen in Large Automotive Foundry.

do you have Hot Sand problems?



Shop View of Jacketed Rotary Screen Showing Unit Support. Dust Housing Partially Removed to Show Screen Cloth.



Rotary Cooler Screen Showing Controlled Air Inlet Ports, Exhaust Housing and Tailings Breeching.

Bartlett-Snow Rotary Cooler Screens offer a real solution. Unique design. Proven installations. When necessary, controlled additions of water assure the discharge of sand at 125° F or less, irrespective of feed temperatures.

Combined with the cooling of sand, these specially designed rotary units are available for breaking lumps — for scalping off troublesome sprues and tailings,— for fine sand screening, etc. Consult Bartlett-Snow for any cooler screen, breaker screen, rotary screen, scalping screen, hex screen, or sprue mill requirement.

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CLEVELAND 5, OHIO

FABRICATORS ERECTORS

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